

JPRS-TND-90-016  
20 SEPTEMBER 1990



FOREIGN  
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***JPRS Report***

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**Nuclear  
Developments**

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# Nuclear Developments

JPRS-TND-90-016

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20 SEPTEMBER 1990

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**Safety Report on Daya Bay Called Misleading**

*HK0408031890 Hong Kong SOUTH CHINA MORNING POST in English 4 Aug 90 p 3*

[By Muriel Lau]

[Text] The British team which prepared a risk assessment report on the Daya Bay nuclear plant was yesterday accused of misleading the public into believing the plant would be safe.

The Joint Conference for the Shelving of the Daya Bay Nuclear plant said the report was only "a figment of the imagination" because the British team had no on-site data on which to base its conclusions.

It had also not taken into account the serious effects of past accidents such as the Chernobyl disaster in the Soviet Union, the concern group said.

A spokesman for the group, Mr Anthony Ha Man-ho, said Britain had no experience in the type of pressurised water reactor to be used in Daya Bay.

"They have no reactor of this kind in English," Mr Ha said.

"All they (the consultants) used was information borrowed from the United States where use of this type of reactor has been stopped for a very long time because of safety reasons.

"Besides, the report only produced mechanical and factual data and does not address human errors which is our main worry."

Concern had arisen following an incident when construction workers left concrete bars out of the plant's base.

Legislative Councillor Mr Edward Ho Sing-tin, from the engineering constituency, had stated openly that such mistakes could never happen in Hong Kong.

"People in China are not quite competent to handle advanced equipment—even with simple construction of the base, they made a serious mistake," Mr Ha said.

"So, if in the future, they are going to manage the plant by themselves, human errors such as internal fires could be a major source of serious accidents."

The concern group said previous reports on the safety of the nuclear plant had been hiding facts from the public.

"In the past, the safety shell of the plant was said to be 100 per cent safe with no malfunction and no breakdown, but now they admit the shell could be destroyed by a plane crash, earthquakes, fires or internal flooding," Mr Ha said.

He said that a plane crash was not unlikely as experts believed the future airport in Shenzhen would only be two kilometres from the plant.

"There is actually an active fault line very near the plant, although they said it was only an inferred fault line," he said.

"They admitted it might produce serious earthquakes—enough to alter the plant."

While the British consultants insisted that the probability of an accident occurring at Daya Bay was only one in 2,500, the concern group pointed out that the population affected once an accident occurred could be as high as 100,000 people.

**Pakistan's Premier Praises Nuclear Cooperation**

*OW2108185490 Beijing XINHUA in English 1832 GMT 21 Aug 90*

[Text] Islamabad, August 21 (XINHUA)—Pakistan caretaker Prime Minister Ghulam Mustafa Jatoi today expressed his appreciation and support to the cooperation between Pakistan and China in peaceful use of nuclear energy.

He made this remark when he met visiting Chinese nuclear industry delegation headed by Chen Zhaobo, deputy general manager of China's nuclear industry company, here this evening.

He also expressed his gratitude to China for its help and cooperation in providing 300 mw nuclear power plant to Pakistan.

An agreement to this effect was signed between the two countries when Chinese Premier Li Peng visited Pakistan in November last year.

Chinese Ambassador to Pakistan Tian Ding was present on the occasion.

**Pakistan President Meets Nuclear Industry Group**

*OW2108040390 Beijing XINHUA Domestic Service in Chinese 0619 GMT 20 Aug 90*

[Text] Islamabad, 19 Aug (XINHUA)—Pakistani President Ishaq Khan received a visiting delegation from China's nuclear industry on 19 August. The two sides discussed cooperation in the peaceful use of nuclear energy.

During the meeting, the Chinese delegation conveyed to President Ishaq Khan the regards of President Yang Shangkun and Premier Li Peng. President Ishaq Khan also asked the delegation to convey his regards to President Yang Shangkun and Premier Li Peng.

The Chinese delegation arrived here on 13 August. It is led by Chen Zhaobo, vice president of China National Nuclear Industry Corporation.

**Prevention of Nuclear Proliferation Stressed**

OW1209061790 Beijing XINHUA in English  
0158 GMT 12 Sep 90

[Text] Geneva, September 11 (XINHUA)—China stressed today that the prevention of nuclear proliferation must include a complete prohibition and destruction of nuclear weapons to safeguard world peace and stability.

Hou Zhitong, Chinese ambassador and head of the first Chinese observer delegation to the fourth review conference of the parties to the Treaty on the Non-Proliferation of Nuclear Weapons, made the remarks.

He said that the treaty has played some positive role in preventing the proliferation of nuclear weapons.

However, he pointed out, it has failed to reach a balance between the obligations of the nuclear-weapon states and those of the non-nuclear-weapon states.

China seeks a policy of not to encourage or engage in nuclear proliferation and not to help any country develop the deadly weapons, he said.

He stated that to achieve the objective of a world free from nuclear weapons, the United States and Soviet Union, which possess the largest nuclear arsenals, must sincerely fulfill their special obligations by taking the initiative in stopping the test, production and deployment of nuclear weapons.

He reaffirmed China's insistent stand that it would never be the first to use or threaten to use nuclear weapons under any circumstances and at any time.

The fourth review conference, which started August 20, is scheduled to close September 14.

**Radiation Lab Built in Shanghai**

OW2808174990 Beijing XINHUA in English  
0955 GMT 28 Aug 90

[Text] Shanghai, August 28 (XINHUA)—China has built a radiation lab in Shanghai, the country's largest industrial center, and it will be open to both domestic and foreign researchers.

The lab is located at the Shanghai Institute of Nuclear Research under the Chinese Academy of Sciences.

It will concentrate on studies of damage done by radiation on biological tissues and the molecular mechanism of damage-control measures.

**Nonproliferation of Nuclear Weapons Examined**

OW1808172990 Beijing GUOJI WENTI YANJIU  
in Chinese No 3, 13 Jul 90 pp 24-28

[Article by Zou Yunhua, entitled "Nonproliferation of Nuclear Weapons; An Observation on the Eve of the

Fourth Review Conference of Signatory States to the "Treaty on the Non-Proliferation of Nuclear Weapons"]

[Text] The question of the nonproliferation of nuclear weapons has attracted worldwide attention because it directly concerns international security and stability. At present, the international community's forces for promoting disarmament and the elimination of the threat of a nuclear war have become the main stream for preventing the proliferation of nuclear weapons, but the danger of nuclear proliferation still remains. It is still necessary to adopt an effective measure to consolidate the present unsound system of nuclear nonproliferation. There are still differences between the nuclear powers and the nonaligned countries on the question of nuclear disarmament and a nuclear test ban.

One of the important issues in the area of nuclear disarmament and the control of nuclear armaments is preventing the proliferation of nuclear weapons. Whether or not this issue can be properly settled concerns the future of ending the nuclear arms race and of effecting nuclear disarmament. At the same time, it also constitutes an important factor in determining whether the international community can have peace and stability when it enters the next century. The fourth review conference of the Treaty on the Non-Proliferation of Nuclear Weapons (hereafter referred to as the Treaty) will be held in Geneva from 20 August to 14 September this year. When the Treaty expires in 1995, a conference of the Treaty's signatory states will be held to discuss whether to prolong the Treaty. The future and destiny of the Treaty remain the concern of the international community.

**1. Origin of the Question of Nuclear Nonproliferation**

The question of how to ensure that atomic energy will be used only for peaceful purposes has been around since its discovery by mankind. The United States exploded the first atomic bomb in 1945. This not only proved the technological feasibility of nuclear weapons but also demonstrated the unprecedented destructive power of atomic energy. Mankind has had to face new problems and new challenges because of the coming of the atomic age. The atomic bomb—a weapon with incomparable might and destructive power—has consistently been a focal point of concern for the United Nations.

In January 1946, the United Nations adopted a resolution on establishing a UN Atomic Energy Commission. The purpose of the commission was to ensure that atomic energy will be used only for peaceful purposes, and to conduct supervision over this matter. In the 1950s, as the United States and the Soviet Union began to provide technical assistance to other countries regarding the peaceful use of atomic energy, proliferation of related nuclear technological knowledge for military purposes also began to accelerate. Thus, preventing the proliferation of nuclear weapons became an increasingly pressing issue. From 1956 to 1957, the Soviet Union and the United States put forward a motion at the

Panel Committee of the Disarmament Committee on directly handling the proliferation of nuclear weapons. In 1961, the UN General Assembly unanimously adopted a draft resolution "The Prevention of Further Proliferation of Nuclear Weapons," which was put forward by Ireland. The draft resolution contained the following: 1) Countries with nuclear weapons should guarantee not to transfer to countries without nuclear weapons the powers for controlling nuclear weapons and the information needed for manufacturing nuclear weapons. 2) Countries without nuclear weapons should guarantee not to manufacture nuclear weapons or use other means to acquire the powers for controlling nuclear weapons.

The emergence of nuclear weapons brought about the international community's common efforts to restrict and eliminate these weapons, and to prevent these weapons from proliferating.

## 2. Nuclear Nonproliferation System

As of this date, the most important treaty related to the international legal system on nuclear nonproliferation is the "Treaty on the Non-Proliferation of Nuclear Weapons," which was first signed on 1 July 1968, and took effect on 5 March 1970. So far, 141 countries have signed on the treaty. Major countries that signed the treaty in the 1980's are Turkey (1980), Egypt (1981), Uganda and Vietnam (1982), the DPRK (1985), Colombia (1986), Spain (1987), and Saudi Arabia (1988). China and France have not signed the treaty.

France and China successfully detonated nuclear devices in 1960 and 1964 respectively. As a result, the United States and the Soviet Union were very much worried that more countries would possess nuclear weapons. Therefore, the United States rushed to put forward in August 1965 to the Geneva 18-Nation Disarmament Committee a draft treaty on preventing the proliferation of nuclear weapons. In September the same year, the Soviet Union also put forward a draft treaty to the UN General Assembly. In the fall of 1966, the United States and the Soviet Union began secret talks, and, on 24 August 1967, put forward to the 18-Nation Disarmament Committee a joint draft on the "Treaty on the Nonproliferation of Nuclear Weapons." On 11 March 1968, the United States and the Soviet Union again put forward a joint revised draft. On 12 June 1968, the UN General Assembly approved the draft treaty. This is how the treaty was born.

The treaty is the cornerstone of the international system of nonproliferation of nuclear weapons. The main contents of the treaty are as follows: Signatory countries with nuclear weapons are not allowed to transfer to any countries without nuclear weapons any nuclear weapons, detonating devices, and the powers for controlling these weapons and devices; and should enter talks on stopping nuclear arms race and on nuclear disarmament as early as possible. Signatory countries without nuclear weapons are not allowed to accept, manufacture, or use other

means to acquire nuclear weapons and nuclear detonation devices; and should commit themselves to accepting all safeguards measures of the International Atomic Energy Agency [IAEA]. The three purposes of the treaty are as follows: prevention of nuclear proliferation, working for nuclear disarmament, and working for the peaceful use of nuclear energy.

The second mechanism of nuclear nonproliferation is the aforementioned IAEA safeguards system. This system is composed of specific measures for enforcing nuclear supervision with a view to preventing nuclear materials from being diverted to military use or for other prohibited purposes. Both the treaty and the "Nuclear Suppliers Club" provide safety and supervision requirements to be enforced by the IAEA with its safeguard system. As of now, about 90 nations have signed safeguard agreements with the IAEA.

The principal measures of enforcing the safeguard system are as follows: (1) Measuring nuclear materials. This means that the quantity, degree, flow, and loss of nuclear materials are measured and recorded, the cause and amount of loss is analyzed, and reports are submitted to the IAEA periodically. (2) Insulation. This means sequestering nuclear materials (by way of, for example, storage facilities, walls, or containers) or sealing them up (with metal, paper tape, fibre optics, or ultra-sound). (3) Monitoring. That means installing monitoring devices (including all sorts of photo equipment and closed-circuit televisions) on essential measuring points of nuclear facilities and on-site monitoring by inspectors.

The third mechanism for preventing nuclear proliferation is the "Nuclear Suppliers Club." In the early seventies, intensified commercial competition in the international nuclear market led to a relaxation in safeguard requirements. For example, in 1973, West Germany agreed to sell complete nuclear fuel recycling equipment and technology; France agreed to provide reprocessing facilities to Pakistan and South Korea; and the United States approved the sale of reactors to Egypt and Israel. Moreover, in 1974, India carried out a so-called peaceful explosion using plutonium produced with a heavy water reactor imported from Canada in the 1950s. This aroused great alarm among the nuclear export nations including the United States and the Soviet Union. To further step up measures against nuclear proliferation and ensure that the nuclear export nations will not violate nuclear nonproliferation in international trade, the seven major nuclear export nations—the United States, the Soviet Union, Britain, France, West Germany, Canada, and Japan—met behind closed doors in London on several occasions since 1975. They formed the "London Nuclear Club" and adopted two agreements: the "Standards of Nuclear Exports" and the "Trigger List" [chu fa qing dan 6051 4099 3237 0830]. Later, it became the "London Club of 15 Nuclear Export Nations" after Italy, Belgium, Switzerland, Sweden, the Netherlands, the GDR, Czechoslovakia, and Poland endorsed the guidelines of the agreements and joined as

member nations. As of now, the "Standards of Nuclear Exports" have been endorsed by 23 major nations in the East and West in the form of government declarations.

The major requirements set by the "London Club of Nuclear Export Nations" for ensuring nuclear safety are: 1) All items in the "Trigger List" must be subject to the safeguards system of the IAEA. 2) The export of sensitive technologies, such as the technologies for condensing uranium, for finishing processing [hou chu li, 0683 5710 3810], and for producing heavy water, must be put under strict control. Export of these technologies must be attached with special conditions. 3) Recipient countries must receive permission from the original supplying countries before transferring imported technologies to a third country, and must make the same commitment not to use imported technologies to manufacture any kinds of nuclear explosion devices within 20 years.

In addition to the aforementioned three major systems, some treaties, especially regional nuclear-free treaties, such as the Latin American Nuclear-free Zone Treaty, the Antarctica Treaty, and the South Pacific Nuclear-free Zone Treaty, also have become a part of the system on preventing nuclear proliferation, demonstrating the efforts made by signatory countries to these treaties. To ensure that no nuclear weapons will exist in their respective zones, these countries have established nuclear-free zones on a voluntary basis, and, according to local conditions, have adopted specific measures for preventing nuclear proliferation.

### 3. The Treaty's Effects and the Problems Facing It

Since the treaty took effect, the number of its signatory countries has increased year by year, making it one of the armament control treaties with the largest number of signatory countries. The establishment of the treaty and the large number of signatory countries attached to it demonstrated in a prosaic manner the wishes of all countries in the world for nuclear disarmament, for eliminating nuclear threat, and for preserving world peace. The establishment of the treaty also expressed the wishes of the vast number of countries without nuclear weapons to promote nuclear disarmament and to exchange the right to possess nuclear weapons for aids for the peaceful use of nuclear energy. Over the years, the treaty has been the pillar of the international community's efforts to establish a lasting system on nuclear nonproliferation. Obligations imposed by the treaty established a legal means and a boundary for preventing nuclear proliferation. Undeniably, the treaty has played an important role in preventing nuclear proliferation and in limiting and slowing down the emergence of threshold nuclear countries.

However, because of inherited drawbacks of the treaty and various other complicated factors, the treaty has already faced and will continue to face the following three challenges:

First, signatory countries to the treaty without nuclear weapons have been disappointed and discontented

because of failure of signatory countries with nuclear weapons to carry out their obligations regarding nuclear disarmament and nuclear test bans. If this situation does not change or improve, it will affect directly the results of the fourth meeting to examine the treaty, which will be held in August and September this year. It will also become one of the key factors deciding whether or not the treaty could be extended or become a permanent treaty when it expires in 1995. Both the preface and Article Six of the treaty emphasize the obligations of signatory countries with nuclear weapons, and specify that these countries "as early as possible should stop the nuclear arms race and take effective measures aimed at nuclear disarmament," and "should hold sincere talks on stopping the nuclear arms race as early as possible, on taking effective measures to promote nuclear disarmament, and on concluding a treaty on sweeping and thorough disarmament under stringent and effective international supervision." However, since the treaty was first signed in 1968, the nuclear arms race between the United States and the Soviet Union not only has not stopped or slowed down as called for by the preface and Article Six of the treaty, but has accelerated. The nuclear arms race between the United States and the Soviet Union has escalated year by year, nuclear weapons have been constantly modernized and improved, the accuracy and mobility of strategic nuclear weapons and the ability to conceal them have been improved day by day, and constant efforts have been made to improve tactical nuclear weapons. The various types of nuclear weapons possessed by the two countries have long reached the "super kill" level. Because of this situation, many signatory countries without nuclear weapons have complained that they have given up the right to develop nuclear weapons in accordance with the treaty's stipulations, and that the treaty has not had much of a binding force on signatory countries with nuclear weapons, creating an inequality in assuming the obligations imposed by the treaty between signatory countries with and without nuclear weapons. Many countries have stressed not only the need to prevent the lateral proliferation of nuclear weapons (the increase in the number of nuclear powers), but also the need to stop the longitudinal proliferation of nuclear weapons (the continuing development and increase in nuclear weapons by nuclear powers). They have urged nuclear powers, especially the United States and the Soviet Union, to stop developing and increasing nuclear weapons, to reduce nuclear weapons, to stop nuclear testing, and to support countries without nuclear weapons in establishing nuclear-free zones. In addition, many countries without nuclear weapons have suggested that nuclear powers make commitments with a legal binding force, guaranteeing that they will not use or threaten to use nuclear weapons against signatory countries without nuclear weapons. This is what people usually call a "negative security guarantee."

Over the past few years, the United States and the Soviet Union have conducted disarmament and arms control dialogues. Because of the current situation and their own

conditions, they must restrain themselves in the arms race. The joint statement issued at the U.S.-Soviet summit in November 1985 said that a nuclear war cannot be won and should not be launched, and that both countries have a special responsibility to stop the arms race and proceed with nuclear disarmament. At the end of 1987, the United States and the Soviet Union signed the "medium-range missile treaty" and began a real reduction of their nuclear weaponry, the first such action since World War II. Moreover, fairly great progress has been made in U.S.-Soviet talks on a 50 percent reduction of their strategic nuclear weapons. It is probable that an agreement will be reached within the year or in the not-too-distant future. Undoubtedly, this will have a positive effect on the fourth meeting to be held soon for the examination of the treaty and on the treaty itself. However, there are also various signs that justify people's concern that the U.S.-Soviet arms race will be carried on and will continue to cast a shadow on the issue of the nonproliferation of nuclear weapons.

Another challenge faced by the treaty is that the wide application of nuclear energy has complicated further the issue of the nonproliferation of nuclear weapons. Nuclear reactor and nuclear fuel recycling technologies, particularly high-tech development in these fields, and the proliferation of knowledge of thermonuclear weapons have provided new favorable technological conditions for nuclear proliferation. At the same time, they have posed new difficulties in conducting nuclear checks.

At present, use of nuclear energy is rather popular in the world. There are approximately 400 nuclear power plants in more than 30 countries. A fact not to be overlooked is that the civilian nuclear industry can help develop nuclear weapon programs. Apart from the fact that the civilian nuclear industry can be used as a training center for nuclear scientists and technicians, there are three most sensitive technologies in the industry's recycling of nuclear fuel that may have a significant effect on the potential of nuclear weapons production. One is uranium-enrichment technology. The second is the reprocessing of irradiated fuel (spent fuel). This refers to the extraction of a useful by-product from the irradiated fuel in reactors—plutonium, which is a fissionable material (plutonium is another important material for making nuclear weapons). The third is the production of heavy water. With heavy water, plutonium can be produced from heavy water reactors. (Natural uranium can be used as fuel instead of enriched uranium). Because the aforementioned three technologies are essential for a country to possess nuclear weapons, security measures for the export of these "sensitive technologies" have long been regarded as an important way to prevent a country from using its nuclear energy industry to produce feedstock for nuclear weapons production or building secret nuclear weapon factories by using civilian technologies obtained from other countries. For this reason, the "nuclear export guiding principles" and "trigger list" [chu fa qing dan 6051 4099

3237 0830] of the "Londong Nuclear Exporters Club" have set strict conditions for the export of these three technologies. In spite of this, the security measures against the proliferation of these sensitive technologies are not absolutely effective. For one reason or another, some nuclear-threshold countries have now grasped or partially grasped the aforementioned three technologies. In addition, the development in recent years of plutonium-fueled reactor technology has complicated the control and use of plutonium, adding to the complexity of the nonproliferation of nuclear weapons. Here we refer to the breeder, which generally uses a mixture PUO<sub>2</sub> and natural UO<sub>2</sub> as a fuel and which can produce in quantities high-quality weapon-grade plutonium. Because of this, it must be viewed as a reactor with a rather significant bearing on nuclear proliferation.

In addition, the proliferation of advanced technologies related to manufacturing nuclear weapons and their parts and equipment not only add more potential danger to nuclear proliferation but also bring more difficulties in checking nuclear proliferation. At present, an active world market makes it possible to purchase some non-nuclear parts and technologies of nuclear explosives, which are small in size and easy to manufacture in secrecy, such as technologies, materials, and parts of high-speed centrifugal machines.

Another aspect which deserves our attention is the continuous leaking and proliferation of nuclear weapons design and manufacturing technologies. At present, the technology and knowledge in terms of nuclear theory in fission reaction and physical and chemical characteristics in basic loading of nuclear weapons have become widely known. As far as countries with certain industrial capability are concerned, they long have been equipped with the technologies and facilities to manufacture inner-explosive and gun type nuclear devices or other parts. Many countries have been equipped with the technological ability to manufacture less sophisticated fission weapons of low military standards. Of course, one simply cannot manufacture reliable and applicable nuclear weapons without nuclear tests. However, the problem is the continuous leaking of technologies and knowledge directly related to designing and manufacturing thermal nuclear weapons. The hydrogen bomb secret revealed by U.S. "PROGRESS" magazine caused a sensation in the 1970's. In all, the wide revelation of such sensitive information and its consequences is not favorable to preventing nuclear weapons from spreading.

Another grave challenge faced with the issue of nuclear nonproliferation is that, as seen from a world-wide scope, regional conflicts and tensions provide a ground for nuclear proliferation. Therefore, while striving to solve regional conflicts, we must prevent nuclear weapons from spreading.

#### 4. China and Nuclear Nonproliferation

Since the early 1980's, China gradually has adjusted its policy of nuclear nonproliferation. In many instances,

and like many other countries, China has expressed its support for the principle of not spreading nuclear weapons. China has made it clear that it does not advocate or encourage proliferating nuclear weapons, nor does it favor nuclear proliferation or help other countries develop nuclear weapons. China has announced that it will follow the IAEA safety security system when exporting nuclear materials and equipments. It has also expressed the idea that international cooperation in utilizing nuclear energy for peaceful purposes involves some sensitive problems which have to be handled carefully. Facts have proven that China has adopted a serious and responsible attitude toward cooperation in this field. Moreover, in 1964 when it conducted its first nuclear test, China announced that under no circumstances would it use nuclear weapons first. It also announced later that, without any preconditions, it would not use or threaten to use nuclear weapons on nonnuclear countries or regions. China supports the proposal of establishing nuclear-free zones in Latin America, the South Pacific, Africa, the Middle East, South Asia, the Korean peninsula, and other places. It also has signed relevant protocols concerning treaties for nuclear-free zones in Latin America and the South Pacific region. The aforementioned policy and practice adopted by China toward nuclear nonproliferation is in line with China's interests and beneficial to international peace and stability.

Because of the shortcomings that exist in the treaty itself and for historical reasons, China maintains a reserved and critical attitude toward the treaty. China contends that the treaty is unfair in terms of responsibilities shared by nuclear and nonnuclear countries, because it only imposes restrictions on nonnuclear countries while it fails to have any control on the continuous expansion and improvement of super power arsenals. However, China's real actions have proven that it conforms to the goals of preventing nuclear weapons from spreading, promoting arms reduction, and strengthening international cooperation in utilizing nuclear energy for peaceful purposes as stipulated in the treaty. China has decided to send observers to attend the fourth examination meeting on the treaty to be held in August this year.

##### 5. Common Efforts by the International Community

Nuclear nonproliferation has a direct bearing on international security and stability; the prevention of nuclear proliferation is a common responsibility of international society. The prospect for nuclear nonproliferation, as seen from the present situation, is good. No other countries have exploded nuclear devices since India conducted a nuclear explosion in 1974. More importantly, the world situation tends to be relaxed, hot spots in some regions of the world have begun to cool down, and all countries entertain good will in promoting nuclear arms reductions and in reducing nuclear threats. Some developed countries, despite their ability to manufacture nuclear weapons, voluntarily gave up their political intention to possess nuclear weapons. In addition, many medium and small countries also have no intention of developing nuclear weapons. All these countries, in avoiding

nuclear threats of a more realistic and direct nature, urge the realization of a nuclear arms reduction and fervently hope to prevent nuclear proliferation. To sum up, the force in the present international community to promote a nuclear arms reduction and alleviate nuclear wars has become a mainstream of the nuclear nonproliferation movement. However, dangers of nuclear proliferation still exist and it is necessary to take forceful measures to foster a nuclear nonproliferation system, which currently is not very firm.

"The Treaty on the Non-Proliferation of Nuclear Weapons" is having its 20th anniversary in 1990. Three examination meetings attended by signatories to the treaty have been held so far. The first meeting was held in May 1975. The second meeting was held during the August-September period of 1980. Discrepancies of opinions at these two meetings were so great that they almost broke up. Therefore, no results have been achieved. The third meeting was held during the August-September period of 1985, in which discrepancies still existed in such problems as nuclear arms reduction and nuclear tests. However, a "Final Declaration" was formed at the last moment. All these three meetings were held in Geneva.

Judging from the current situation, results of the fourth meeting to examine the treaty, which will be held this August, are expected to be better than those of the previous three meetings. The great majority of the signatory countries have held that, although the treaty has many drawbacks, it is still the pillar of the existing nuclear nonproliferation system, and it has made considerable contributions to strengthening international peace and security, and to enhancing stability and trust in international relations. In addition, progress made by the United States and the Soviet Union in disarmament and arms control talks in recent years undoubtedly will have some positive effects on the forthcoming meeting. However, while approving the treaty, many nonaligned countries, such as Sri Lanka, Indonesia, and Yugoslavia, have stressed the need to stop the vertical [zong xiang 4912 0686] proliferation of nuclear weapons, and have urged nuclear powers to continue to sharply reduce nuclear weapons and to support countries without nuclear weapons in establishing nuclear-free zones. These countries also have stressed relations between the banning of nuclear testing and the treaty, maintaining that continuance of nuclear testing is nothing less than undermining of the treaty's credibility. They have called for changing the "Treaty on Partial Banning of Nuclear Testing", which was signed in 1963, into a treaty banning all kinds of nuclear testing. Undoubtedly, all these demands by nonaligned countries are justified. At the same time, the United States has always maintained that the treaty has no direct connections with sweeping banning of nuclear testing, and has opposed outright the addition to the treaty of clauses on banning all kinds of nuclear testing. It is expected that differences with regard to nuclear disarmament and the banning of nuclear testing between Western nuclear powers and nonaligned countries will surface at the forthcoming fourth meeting to examine the treaty. People are awaiting the results of the meeting.

## JAPAN

### Defense Agency To Clarify Nonnuclear Principles

OW1308093790 Tokyo KYODO in English 0909 GMT  
13 Aug 90

[Text] Tokyo, Aug. 13 KYODO—The Defense Agency has decided to clarify three nonnuclear principles as Japan's basic national policy in the 1990 annual defense white paper to be published in September, agency sources said Monday.

Last year's annual report on defense said merely that Japan will maintain three nonnuclear principles, though earlier white papers had specified that Japan holds fast to the three principles of not possessing nuclear weapons, not producing them and not permitting their introduction into Japan as a matter of national policy.

Opposition parties accused the government of changing the phrase in the 1989 defense white paper, saying the government changed defense policy. In response to opposition accusations, Prime Minister Toshiki Kaifu promised to order the Defense Agency to stress the principles as Japan's basic national policy in its 1990 white paper.

The agency has explained that the phrase changes were merely editorial in nature. But there have been speculations that the Defense Agency intended to drop one of the three nonnuclear principles—not to introduce nuclear weapons into Japan.

The sources said "fierce" arguments arose as to whether the principles should be emphasized as the country's basic national policy in the 1990 defense report, adding some agency officials argued to do so is a retreat of Japan's defense policy.

### Stronger Antinuclear Proliferation Steps Urged

OW1708140990 Tokyo KYODO in English 1352 GMT  
17 Aug 90

[Text] Tokyo, Aug. 17 KYODO—Japan will press for stronger enforcement measures to halt the spread of nuclear arms at an international review of the 20-year old Nuclear Non-Proliferation Treaty (NPT) to be held next week, the government said Friday.

The NPT Reviewing Committee opens its fourth session in Geneva, Switzerland on Monday, with the aim of resolving problems in the treaty, which is widely expected to be extended after it expires in 1995. Japan will propose that the nuclear 'club' of nations possessing atomic weapons open all their nuclear facilities for peaceful use to inspection by the International Atomic Energy Agency (IAEA), officials said.

Nuclear nations are now allowed to specify which sites will be open to inspection by the United Nations body while signatories without nuclear weapons must open all sites.

Japan will also seek stronger controls on the export of nuclear technology, requiring detailed explanations on the purpose of related equipment before granting permission for its export.

In addition to the professed nuclear powers of China, Britain, France, India, the Soviet Union and the United States, several other nations are believed to have the capability to produce nuclear arms. Japan will also press for nonsignatory nations to join the treaty as well as greater arms reduction efforts by members of the nuclear club.

## THAILAND

### Energy Administration Official Concerned Over Waste Issue

90WP0146B Bangkok THE NATION in English  
22 Jul 90 p 2

[Text] There are still no effective measures to dispose of nuclear wastes and prevent the leakage of radioactivity if a power plant using that fuel is to be set up in Thailand, a senior government official warned yesterday.

Adhorn Suppodok, secretary general of the National Energy Administration, admitted that the two problems remain the primary concerns for operating such a plant.

However, Adhorn said chances that the nuclear plant would suffer accidents are minimal when compared to the operations of electricity generating facilities powered by other energy sources.

While admitting that accidents in nuclear power plants, if they occurred, would be very serious, Adhorn claimed, that a hydro-powered electricity generating plant, if it collapsed, would equal the destructive power released by the atomic bomb dropped on Hiroshima, Japan during World War II.

But he said, because Thailand needs more electric power to meet the rising demands for electricity, it should start thinking about conducting a feasibility study on the setting up of a nuclear-powered plant.

It is necessary, he said, that Thailand takes a look at nuclear power as an alternative source for electricity production because of the rapidly-growing industrial sector's hunger for more energy.

Adhorn, however, said he thought it might be difficult for Thailand to establish such facilities as long as Thai people were concerned about the impact of the nuclear power plant on the environment.

He said problems concerning the construction of a nuclear power plant in Thailand exist because academics have failed to make the public understand the benefits of nuclear operations.

Adhorn said he had talks with several international environmentalists on the issue and found that they

preferred nuclear power to other sources of energy including water, oil and lignite for electricity generation as the former would not damage the environment.

Adhorn quoted the environmentalists as saying that the construction of hydro-powered electricity generating plants will destroy forests and that the use of oil and lignite contribute among other fuels, to the warming of the earth which results in the so-called "Greenhouse Effect."

#### **Senior Official Wants Feasibility Studies for Power Plants**

90WP0146A Bangkok *THE NATION* in English  
19 Jul 90 p 2

[Excerpt] Thailand should start feasibility studies and the search for sites to build nuclear power plants now so that the plants will be finished in time to meet future energy needs, Prime Minister's Office Minister Anuwat Wattanapongsiri said.

Anuwat said yesterday he believed Thailand would need nuclear plants in 20 years after it had exhausted all other means of electricity production, such as hydroelectric dams and coal-and-gas fuelled plants.

He said it would take up to 12 years before a nuclear power plant would be up and working in Thailand, including the time it would take to choose a location for the plant.

"Nuclear plants are the cleanest and cheapest source of energy available if security measures are strictly observed," Anuwat said.

The minister said the chances that a nuclear plant in Thailand would leak radioactivity were almost zero because the plant would [be] subjected to close scrutiny by international agencies charged with nuclear regulation before and after it was built.

Proposals to build nuclear plants here have been discussed for more than 10 years. But until recently the proposals have been shelved by the government because of strong public opposition. [passage omitted]

## ALBANIA

### Government To Adhere to Non-Proliferation Treaty

AU1708091590 Tirana ATA in English 1726 GMT  
16 Aug 90

[Text] Tirana, 16 Aug (ATA)—The Presidium of the People's Assembly of the People's Socialist Republic of Albania decided by decree the adherence of our country to the nuclear weapons' Non-Proliferation Treaty. The instruments of adherence will be soon deposited at the governments of the United States, the Soviet Union, England which are depositary parties of the treaty.

This treaty, in which 140 states participate, envisages engagement in non-proliferation of the atom weapons and the adoption of effective measures to stop the nuclear armaments' race.

## BULGARIA

### Study Documents Soil Contamination by Radioactivity

90WP0107A Sofia GRAZHDANSKA OTBRANA  
in Bulgarian No 14, Mar 90 pp 1-18

[Article by Marin Naydenov of the Nikola Pushkarov Soil Study and Crop Programming Institute: "Is the Food Chain Healthy?"]

[Text] The human factor is exerting an ever-greater influence on the environment. We are witnessing a great number of failures, from the deterioration of individual regions and their destruction as a result of human activity to the global greenhouse effect. It is the mission of ecology to observe and study these phenomena and point out ways of avoiding the negative consequences of economic development. The study of extremely urgent problems of radioactive contamination of ecosystems and research on the processes of migration of radionuclides along the biological chain and the effects of ionizing radiation have made radioecology the fastest growing branch of ecology.

The experiments with nuclear weapons in the atmosphere that were conducted before 1962 led to assembly of a large body of data on the content and distribution of individual radionuclides after nuclear and thermonuclear explosions.

Interesting conclusions can be drawn by comparing the distribution of radioactive isotopes after an incident at a nuclear power plant with that following a nuclear explosion. Despite the small percentage of cesium isotopes (three-percent cesium-134 and five-percent cesium-137 in the overall contamination picture), they play the most important role because they are active in the migration chain over a period of decades as a result of their longer half-life. The percentage of these isotopes is about 10 to

20 times smaller after a nuclear explosion. The distribution of ruthenium isotopes is also unfavorable. About 48 percent of the total radioactivity after a nuclear explosion is that of isotopes with a short life (xenon-143, molybdenum-99, and neodymium-147). Generally speaking, it may be said that the radioactive consequences after an incident at a nuclear power plant are much more serious than those resulting from a nuclear explosion.

For the reasons indicated, we concentrate our attention on the isotopes of cesium-137 and strontium-90 and on study of their behavior in the soil because they are the main sources of more persistent contamination. We have correlated the data obtained on the basis of soil differences for the sake of more systematic consideration of the processes of propagation of these isotopes vertically downward in the soil profile. We have selected as uncultivated soil three types of soil typical of Bulgaria (leached chernozem, carbonate chernozem, and alluvial meadow soil (Table 1)). The table shows that the largest amounts are retained in the zero-to-five-centimeter surface layer of soil. Detectable amounts are also present in the 30-to-50-centimeter layer. The relatively stronger penetration by strontium-90 observed in the case of carbonate chernozem is probably due to soil erosion in these areas.

The table reflects the penetration of cesium-137 and strontium-90 over the soil profile for five cultivated soils. Unlike the virgin soils, in the case of the soils subjected to intensive cultivation (fertilization, irrigation), the processes of absorption and migration of radioactive isotopes are determined largely also by the method of cultivation. Hence, these processes must be studied over a protracted period of time. It is to be seen from the data in the table that the strongest penetration is observed in the case of the alluvial meadow soil and carbonate chernozem.

Depending upon the season, radioactive deposits may reach the well developed plant cover as well as the soil. Hence, it is especially important to observe the level of contamination and its distribution in the case of direct impingement on crops determining the diet of the population. Inasmuch as the classical route of advance of radionuclides through the roots of plants is bypassed, it is related directly to the degree of development, the time of binding, and the mode of consumption of different crops. Under the circumstances of the changed radiation situation in May 1986, the contamination affected mostly vegetables in an advanced phenophase of development, and vegetables with a large leaf area (lettuce, onions, parsley, spinach) are the most vulnerable under these conditions. The subsurface parts of plants (potatoes) are largely protected. It should be pointed out that iodine isotopes are the most important ones in the case of leafy vegetables because these vegetables are intended for prompt consumption but present no danger in the case of cereals and other foods, which may be consumed a long time after the isotopes decay.

Radioactive contamination of some strategic farm crops affects barley most heavily and, to a lesser extent, corn. Beets and soya are the least contaminated. The highest values are found in straw, and the lowest in seed. Contamination of livestock feed and the seed of some crops can also contribute to the dosage exposure on the population through meat and livestock products.

When a critical radiation situation arises, fruit orchards are also heavily affected. The phenophase of blossoming and the length of the growing season play a decisive part in the accumulation of fission products in the reproductive parts of vegetation.

It is logical to expect to observe a high level of radioactive cesium in plants that display a predilection for potassium in their metabolism, whereas the amount of strontium-90 is higher in ones that accumulate calcium. Significant differences sometimes occur in the amounts of radionuclides accumulated in different plants, often within the same plant family. The black currant and the French red grape accumulate more radioactive isotopes than the raspberry and the strawberry. The level of contamination of the apple is higher than that of the

pear, while Morello and sweet cherries contain a larger amount of radionuclides than plums, apricots, and peaches.

Bulgaria is a major exporter of medicinal herbs. A higher level of contamination is observed in some cases, such as those of lichens, mosses, and other perennial plants that tend to accumulate radionuclides, even in ones harvested in later years, so that systematic and continual monitoring is required.

Certain inferences may be drawn in conclusion. The extent of radioactive contamination of soils is not such as to require special measures restricting the penetration of radionuclides into plants grown in these soils. The selection of suitable crops and the implementation of measures devised to ensure better use of produce can greatly lower the amount of radionuclides in human nutrition. The introduction of suitable feeds in livestock raising can also have a beneficial effect. Natural decay and isotope dilution result in a permanent trend toward reduction of radioactive contamination, but, at the same time, also toward universal penetration of long-lived radioactive isotopes into the migration chains.

Table 1  
Measured Cesium-137 and Strontium-90 Content of Virgin Soils  
of Basic Soil Varieties (1987), as Percent of Total Activity  
of 0-50 Centimeter Layer

Soil Type	Depth in cm	Average Values									
		Byala Slatina		Buzovetsk		Tolbukhin		Vratsa		Strontium-90	
		Strontium-90	Cesium-137	Strontium-90	Cesium-137	Strontium-90	Cesium-137	Strontium-90	Cesium-137	Strontium-90	Cesium-137
Leached cher-nozem	0-5	62%	74%	64%	76%	72%	82%	53%	44%	68%	73%
	5-15	23%	19%	22%	16%	18%	13%	21%	19%	21%	17%
	15-30	9%	4%	9%	5%	9%	4%	18%	32%	10%	8%
Carbonate cher-nozem	Oryakhovo		Kozloduy		Svishtov		Belene		Average values		
	0-5	53%	78%	52%	66%	74%	88%	50%	73%	55%	77%
	5-15	21%	13%	17%	26%	14%	9%	30%	24%	21%	16%
	15-30	28%	7%	23%	5%	12%	3%	20%	3%	16%	5%
	30-50	7%	2%	7%	2%	—	—	—	—	7%	2%
Alluvial Meadow Soil	Sofronevo		Dolni Tsibur		Belene-Catchment				Average Values		
	0-5	70%	88%	61%	75%	70%	60%			63%	69%
	6-15	18%	8%	31%	17%	30%	40%			26%	26%
	15-30	5%	3%	5%	8%	—	—			73%	4%
	30-50	4%	1%	—	—	—	—			3%	1%

Table 2

Soil Type/ RADIO- NUCLIDE	Depth	Alluvial Meadow Soil		Carbonate Chernozem		Gray Mountain Soil		Cinnamonic Podzolized Soil		Mediterranean Black Soil	
		1986	1987	1986	1987	1986	1987	1986	1987	1986	1987
Cesium-137	0-5 cm	50%	59%	48%	49%	76%	45%	87%	43%	70%	49%
Strontium-90		47%	—	40%	—	52%	—	56%	—	56%	—
Cesium-137	5-15 cm	31%	25%	25%	37%	18%	29%	7%	41%	17%	26%
Strontium-90		35%	—	24%	—	30%	—	19%	—	28%	—
Cesium-137	15-30 cm	19%	16%	27%	14%	6%	26%	5%	16%	13%	25
Strontium-90		13%	—	36%	—	18%	—	24%	—	16%	—

Note: The figures are expressed as a percent of the total radioactivity of a layer to a depth of 30 centimeters, this probably being due to the better water permeability of the two types of soil, alluvial meadow and carbonate chernozem (2 to  $7.10^{-3}$  cm/sec; in comparison, note that the water permeability of the other soils ranges from 1 to  $4.10^{-3}$  cm/sec). Liliya Misheva, Ivanka Yordanova, Donka Staneva, Avgustin Naydenov, and Christina Turpanova participated in the study.

## CZECHOSLOVAKIA

**Calfa on Venice Meeting, Austrian Energy Plan**  
AU0708094990 Prague *MLADA FRONTA* in Czech  
2 Aug 90 p 1

[Interview with Premier Marian Calfa by Vladimir Schodelbauer at Ruzene Airport in Prague on 1 August: "Calfa; Interest!"]

[Text] [Schodelbauer] What was the reaction of the individual countries to Franz Vranitzky's proposal for the establishment of a zone in Central Europe free of nuclear power plants? Did Mr. Vranitzky offer Czechoslovakia specific help should the V-1 blocks at the Jaslovske Bohunice nuclear power plant be shut down?

[Calfa] Austria's stance in the sphere of nuclear energy policy differs considerably from the other four countries, which all operate nuclear power plants. Our opinion and, obviously, the opinion expressed by our other partners, is that this is a technical problem. In Austria this issue has very strong moral, social, and—obviously—political overtones. Mr. Vranitzky finally formulated his proposal in such a way that an immediate moratorium is not the issue here; the issue involves the prospective trends in energy policy development. The other participants' reaction was somewhat reserved and, in essence, this issue was not analyzed further. As far as the Jaslovske Bohunice nuclear power plant is concerned, Mr. Vranitzky offered energy supplies for the period the reactor is not in use during the independent commission's inquiry. However, our reactor's output is not so great that our other power plants could not substitute for it. A decision on the possible closure of the reactor is in the hands of the independent experts and the government will respect their decision.

[Schodelbauer] What do you consider to be the most important result of your talks?

[Calfa] If I had to give a brief answer, I would say, first, it is the great feeling of belonging to this region and, second, the evident interest and effort shown in cooperating to achieve mutually advantageous results.

## Nuclear Plants' Safety Severely Criticized

90CH0307A Hamburg *DER SPIEGEL* in German  
23 Jul 90 pp 112-116

[Unattributed article: "No Megawatt, No Bonus"—first paragraph is SPIEGEL introduction]

[Text] Sloppiness, technical safety deficiencies and a steady stream of operational accidents are daily occurrences in the CSFR's nuclear power plants: the overly ambitious Czechoslovak nuclear energy program is shown by internal reports of the Prague Atomic Energy Commission to be turning into a great stumbling block for the young democracy.

Thinking about his work gives Jan Zpevacek [not his real name], a nuclear energy engineer at the Slovak SEP power combinat, heartburn these days. "This project," complains the unhappy specialist, "is a nightmare: it should never have seen the light of day."

The source of Zpevacek's anxieties is located in Jaslovske Bohunice in southern Slovakia. There, deep within the catacombs of the shutdown "A-1" nuclear power plant, 40 tons of burned out uranium fuel have been lying in the bright blue pool of water of an old storage tank, awaiting removal to a final storage site which is nonexistent.

The deadly radiating material, packed in 150 steel storage containers, has long since penetrated through the fuel rod sheaths; nobody knows to what extent the steel

containers have rusted out. For purposes of disposal, which becomes more urgent from one day to the next, Zpevacek and his crew are supposed to remove the highly radioactive junk from the pool with a specially constructed apparatus during the next few months and to break it up into pieces small enough to fit into Soviet-built transport containers.

At the same time, remote handling devices must be used to pump 70,000 liters of liquid, plutonium-containing radioactive waste and to transfer it to a new collecting pool—an adventure with an uncertain ending: should the plutonium concentration of the liquid be greater than expected, this could lead to the formation of critical masses which could explode in sudden chain reactions; radiation contamination of the surrounding area would be inevitable.

"Nobody knows," fears Zpevacek, "whether the stuff will blow up in our faces; it will be done anyway." Many of his colleagues share these worries. The daring procedure for disposing of the radioactive waste from the Stone Age of East European nuclear technology is only one of the many dangers confronting thousands of nuclear power employees of the country.

Blinded by ideological delusions of grandeur and blindly believing in salvation from energy production derived from the split atom, the former communist rulers equipped the small country in the heart of Europe with an oversized nuclear industry, whose technological and economic risks have until now been underestimated even by Western critics. The nuclear heirloom of the Communist Party dictatorship, warns Ladislav Zachar, who until 1985 was in charge of safety for the Czech CES power kombinat, "could turn our country into a disaster area."

With eight active Soviet-type WWER 440 reactors in Bohunice and in Dukovany, Moravia, the CSFR's power supply derives even now from nuclear power plants at a 25 percent rate. Another four nuclear power plants of the 440 megawatt class are nearing completion in Mochovce in southern Slovakia; in Temelin, Bohemia, near the Austrian border, the cooling towers for yet another four 1000 megawatt reactors are reaching into the sky.

Contrary to the practice in other former Soviet satellite states, the communist regime had 80 percent of the power plant components built in their own country under Soviet license, at the mammoth Skoda plant. Altogether the nuclear industry of this country with a population of 16-million employs about 30,000 people.

Protests against the big nuclear construction program have primarily originated in nuclear-energy-free Austria. Less than 100 kilometers separate the megalopolis of Vienna from the eight active reactors. Should there be, for instance, an uncontrollable accident in one of the four Dukovany reactors, the Viennese, faced with a northwest wind of average speed, would have only about

6 hours' notice to flee from the radioactive cloud, according to calculations by an international group of scientists in 1987.

Critics are particularly worried about obsolete Soviet reactor technology. None of the reactors now in service has a containment which in a big accident could hold back the high pressure radioactive steam. According to the group of experts, the emergency cooling systems of two of the older atomic piles are "rudimentary at best."

For this reason Vienna's Environmental Minister, Marlies Flemming, has several times pleaded in Prague with the revolutionary government of poet-president, Vaclav Havel, to reverse its nuclear policies.

Last Tuesday the minister once again appealed to the CSFR government to close down the Jaslovske Bohunice nuclear power plant, which is situated close to the Austrian border. Inasmuch as the former head of the Czechoslovak Atomic Energy Commission, Jiri Beranek, had expressed serious reservations about the continued operation of that nuclear power plant, she said, it would be irresponsible not to close those reactors down.

Austrian Greenpeace activists staged a symbolic occupation of the building site in Temelin with the intention of mobilizing the population for the fight against nuclear dangers. Such politicians as Upper Austria's Governor Ratzenboeck even planned to incite the neighbors to sort of a "groundswell revolution" to put a halt to the nuclear program.

But, to date, this has caused little change in the construction and operation of the Czechoslovak reactors. Instead, the hard-pressed leadership of the powerful nuclear sector called for help from the international nuclear community: on several occasions, an Osart (Operational Safety Review Team) from the International Atomic Energy Organization, which has been active in the West also, traveled to Dukovany and to the Temelin construction site, and certified that the crews employed there demonstrated an "extraordinarily responsible attitude." According to the official CTK [Czechoslovak News Agency] news agency, Austrian objections amounted only to "mystification," the critics were "incompetent" and "misinformed."

But the Austrians have good reason to worry. Internal reports of the National Commission for Atomic Energy indicate that in the nuclear facilities the operators are no longer able to cope with the unsolved technological problems.

Severe deficiencies are regularly surfacing even during the construction phase of the facilities. The commission noted that during the past year at the Mochovce construction site:

- "the investor could not determine the volume of production and its storage;"
- components were accepted without quality control;
- technical data furnished by contractors "were not

borne out by actual facts;"

- the automatic pilot system was "constantly under development" and its components were "not tested under conditions which were at least partially compatible with actual conditions."

Deficiencies of this kind, confirms nuclear energy engineer Zachar, "have been around since nuclear power plants were first built in our country." Until he was fired in 1985, he kept on arguing for an independent control system at the nuclear power bases—in vain. Says Zachar: "Outside of the factory there is in effect no such thing as quality control."

There is similar chaos in the operation of the active plants. During the past year the commission noted a total of 364 violations in the eight reactors. What all the plants have in common is the fact that the crews cannot depend upon the electronic automatic control system. Occasionally individual switches malfunction; at other times false alarms keep the reactor operators in suspense; once, last April, in block II of Dukovany, the entire memory bank of the mainframe computer crashed.

Frightening conditions exist in Jaslovske Bohunice, more than elsewhere. There, 60 km northeast of Vienna, the Czechoslovak power plant workers twice escaped a major catastrophe during the 1970's.

In the spring of 1976 they brought a domestically built, gas-cooled "A-1" prototype reactor to the edge of a meltdown. At that time, the cover of a fuel element channel came loose under full pressure; the ejected fuel cassette killed one worker; two others choked to death in the hot gases. The region was saved from a Chernobyl-like radiation disaster only by the heroic act of a worker, who, within a few minutes, temporarily closed the open channel by using a reloading machine.

Twelve months later, the crew ignored the temperature readings from the reactor core; some fuel elements melted, all pump and channel systems were damaged and became radioactive.

The accidents and the improper storage of radioactive waste are still contaminating the power plant area and the soil below it. Members of the local surveillance authority reported in NUCLEONICS WEEK that they found up to 24,000 Becquerel of tritium in the ground water and, in the soil around the plant, more than 2 million Becquerel cesium per kilo of soil—ten times the maximum permissible reading in the FRG.

Adjacent to the shutdown Adventure reactor, two blocks, named "V 1" and "V 2," with two water pressure reactors each, are operating; they date from the earliest times of East European nuclear technology.

"V 1," a clone of the now shut down piles in Greifswald, East Germany, which are considered to be extremely hazardous, is "the weakest link of Czechoslovak nuclear energy," in the words of Prague's Atomic Energy Commission.

That is an understatement: in fact, the main cooling lines of these facilities must never spring a leak. The two reactor pressure vessels, surrounded by only a thin concrete shell, are located within about 25 meters of each other, inside a lightweight construction shed, suitable for nothing but simple storage use.

In a joint report by the Comecon surveillance authorities in 1989, it was said that all it would take was a hole measuring 10 cm across in the pipes to break up the concrete cells surrounding the pipes and pumps of the cooling system and to release radioactive steam into the air. However, only the main pipes of the six cooling systems are 50 cm thick. If any one of these pipelines were to be destroyed, thus causing a 1-meter diameter hole (a "2 F-break"), all the crew could do would be to flee for safety; a meltdown would be unavoidable.

It is probable that a much smaller leak could lead to an uncontrollable accident. As they had done in Greifswald, the designers had underestimated the problem of brittleness in the steel walls of the pressure tanks and of the connecting sockets due to neutron bombardment during atom splitting. The monitors in Prague know practically nothing about the actual condition of the plant.

In a report to the government, it is said that, due to "technologically limited monitoring opportunities, assessing the extent of damage to materials is not feasible; therefore, life expectancy cannot be estimated." Considering the "V 1"'s 10-year old tanks, declared a spokesman for the Atomic Energy Commission, it could be assumed that they had become as brittle as those in the Greifswald reactors. Should that be the case, says Hanover materials testing expert Ilse Tweer, who had already inspected the Greifswald tanks, "then any cooling emergency, even with small leaks, could lead to catastrophe."

The materials expert knows that the brittle steel would tear at exactly the moment when the reactor is confronted with a meltdown threat—when emergency cooling is used, which abruptly counteracts the temperature in the tank with cold water.

These deficiencies appear even more worrisome in view of everyday occurrences in "V 1," as described by the supervising agency in its last two annual reports:

- During the annual maintenance operations, the crew noted cracks of a depth of several millimeters in seven out of the 12 pipe linkages in Block 1 and in six linkages in Block 2, which were "taken care of simply by grinding down and soldering."
- On several occasions, based on the motto "no megawatt, no bonus," according to a crew member the operations supervisors disabled the automatic rapid shutdown system, so as to be able to continue operations despite the failure of some components.
- On two occasions, during May and July 1989, the cables of a main circulating pump burned out; the reactor continued operating for several weeks with the remaining pumps. There was no effort to determine

- the cause of the short circuit.
- At midnight on 5 June another short circuit caused a fire in a cable room in the turbine hall of the first reactor block; it took 14 minutes after the first alarm to find the source of the fire in one of the cable shafts—and only then did the shift boss give the order for quick shutdown.

The fact that the fire did not spread to other cable shafts and put all vital systems out of action as, had been the case in the near-meltdown in Greifswald, was, in the terse statement by the accident investigating commission, "due to clear access to the source of the fire and the self-sacrificing devotion of the firefighters."

In addition to all that, geologists had warned the power-plant operators years ago that the location of the "V 1" was adjacent to an earthquake zone which had been detected hundreds of years ago. Nevertheless, a government report states that the subsequently installed sensor system for rapid shutdown after earth tremors was "undependable, unsuitable and incompatible with the other safety systems of the reactor." In view of devastating judgments of that sort, former safety chief Zachar says that "there is but one solution: 'V 1' must finally be shut down for good."

But that is exactly what the nuclear strategists of the former energy ministry, now subordinate to the new minister of economics, Vladimir Dlouhy, are trying to prevent to the best of their ability. Vaclav Urbanek, director of the ministry's nuclear department, makes promises such as "the risks could be made acceptable with reconstruction measures."

"Reheating" of the welding seams of the pressure tanks is supposed to even rehabilitate the brittle steel—a method condemned as unsuitable in the Greifswald case by experts from the FRG Reactor Safety Society.

"The worst of all this," complains Michael Undorf, leader of the Greenpeace campaign against Czechoslovak nuclear dangers, "is the fact that the population is not really being informed about it." According to Undorf, "all energy policies remain firmly under the control of the old apparatus; the new government is not changing a thing about this."

No doubt about it, that government is faced with an almost unsolvable dilemma; the old rulers left their inexperienced successors facing an energy policy disaster area. After the billions spent for nuclear expansion, hardly anything was left for modernizing the totally obsolete, highly uneconomical soft coal power plants in Northern Bohemia and Moravia. The highly sulfur-containing waste gas plumes poisoned humans and nature; hit by an annual average of 2.8 million long tons of sulfur dioxide, almost one-third of the country has turned into an acid wasteland.

The new rulers are therefore glad about every ton of coal that is not burned. A spokesman for the prime minister

told his Vienna critics that there was "unfortunately no alternative" to nuclear energy.

Continuation of the nuclear energy program would however lead the CSFR's economy into ruin also. Back in 1988, the Prognosis Institute of the Prague Academy of Sciences warned that "replacing coal with nuclear energy is no solution," at least for the long term. On the contrary, the program would, "according to economic experts, hamstring structural economic changes." In actual costs, they continued, the construction of domestic nuclear facilities was costing two to three times as much as in Western countries.

Reality has long since proved the wisdom of those issuing the warnings. In all the planning to date, there has been no calculation whatever of the costs of nuclear waste disposal and of the demolition of shutdown reactors. A spokesman for the Atomic Energy Commission estimates that "expenditures at least as great as those used for construction" would have to be added.

Contrary to contractual agreements, the USSR has to date failed to remove a single burned out fuel element from the Czechoslovak water pressure reactors. Since early this year, the former partners have demanded in addition that payment for removal of radioactive waste be made in dollars, which, according to nuclear chief Urbanek, "we are of course unable to do." In June, the newly elected government of the Russian Soviet Republic even announced that soon it would no longer permit foreign radioactive waste to enter at all, since there was no possibility of providing secure final disposal. Sooner or later, Urbanek will, therefore, have to launch a project costing billions for such storage in his own country.

At the same time, the two nuclear complexes currently under construction eat up several million crowns daily; nobody knows whether there will ever be a return on this investment.

The first two blocks in Mochovce were supposed to have come on line long ago. However, the instrumentation and control system newly developed for this plant impressed even the hardened supervisors in Prague as being so unreliable that they demanded a comprehensive reexamination and reinstallation. It may happen, according to a ministry spokesman, that the complete system may have to be purchased for several hundred million marks from Western manufacturers.

The Temelin project threatens to become even more expensive. Even now, those in charge of the construction site measuring 300 hectares figure on a cost overrun of at least DM1 billion for the first two blocks, because the Soviet guidance system will have to be replaced with one from the West.

It remains an open question, whether the reactors will ever be put into operation at all, because the Soviet designers had made mistakes in calculating the nuclear

technological base data: under certain conditions, an uncontrolled acceleration of the chain reaction could occur in the reactor.

The Prague Atomic Energy Commission warns that experience with comparable atomic piles in the USSR "confirms that their operation is difficult to control, making it extremely unstable." Control therefore depends upon "the training and psychological resistance" of the reactor crew. Nobody can tell at this time whether, and at what cost, a new construction of the nuclear zone currently being built is possible.

It is even less clear where the money will come from to finance all of that. Former atomic engineer Zachar, recently named chairman of the Energy Committee in Havel's Citizens' Forum, thinks that "only the Western countries can help us out of the energy tragedy."

During the past few months, visitors to Prague's energy ministry included representatives from Siemens, Westinghouse and General Electric, as well as of the French Government's CEA [Atomic Energy Commission] holding corporation, who are smelling the fresh wind from the East for signs of replacement part business for their bogged down nuclear energy departments. "Offers," Urbanek reports proudly, we have from all of them.

However, the only firm proposal has to date come from the government in Vienna, Austria, according to an offer by Minister of the Economy Wolfgang Schuessel, is prepared to invest 12 billion schillings in environment-friendly power generation on the other side of the border.

That has not to date changed the course of Prague's nuclear energy program. In their most recent report to the government, the experts of the Atomic Energy Commission wrote that they would quickly launch the compilation of an information system, so as to "counter the unfounded misgivings directed against Czechoslovak nuclear energy."

#### Ministry Experts on Uranium Processing

AU1408160090 Prague SVOBODNE SLOVO in Czech  
10 Aug 90 p 4

[Interview with J. Halbrstat and V. Urbanek, economics specialists from the Ministry of Economy, by Martin Fuk, place and date not given: "Crude Oil: A Shock—But What About Uranium?"—first two paragraphs are SVOBODNE SLOVO introduction]

[Text] In the majority of our speculations about the energy situation, we arrive at the conclusion that nuclear technology is not a viable alternative for us to be able to meet all our future energy needs. In light of the existing problems with the supply of crude oil, and with respect to the information about the CSFR uranium production cuts, the question arises whether we are in for a uranium shock as well.

To obtain some basic information, I went to the Federal Ministry of Economy to see Engineers J. Halbrstat and V. Urbanek.

[Fuk] Can you answer the question?

[Answer] International agreements with the USSR on the construction of the VVER [Water-Moderated Water Cooled Power Reactor] nuclear power plants in Czechoslovakia anticipate deliveries of nuclear fuel throughout the whole period of the power plants' lifetime; deliveries are secured by one-year contracts. Contracts to date have been met and contracts for 1992 are under preparation. Despite the program of production cuts, our uranium industry is capable of delivering the uranium needed for the production of nuclear fuel. We are not worried about the shortage of nuclear fuel for our power stations. However, as in the case of other products, the delivered fuel will be paid for in convertible currency; it is therefore not inconsequential to cover 38 percent of the uranium price by domestic production.

[Fuk] Will we have enough uranium for our power plants later on?

[Answer] Thus far our uranium exports have been higher than the amount needed for fuel for our nuclear power plants. During the program of production cuts in the uranium industry, the production of uranium will decline and, at the same time, with the introduction of new blocks being brought into operation, its consumption will grow. According to current assumptions, production and consumption should balance out between 1994 and 1995. Until that time, there will be an over-production of uranium, the volume of which should cover the needs of the following five-year period up to 2000, during which the demand will be greater than the production. The solution to this problem is now being discussed. For example, immediate reduction in mining to the level corresponding to the current needs of the Czechoslovak power industry would have serious social consequences for the workers in the uranium industry and would apparently lead to the loss of the raw material in prematurely closed mines.

[Fuk] What will the situation be after 2000?

[Answer] The amount contained in the uranium deposits discovered in northern Bohemia are capable of meeting our needs for a number of decades. The problem here is not only technological, but also economic. If the uranium market price is lower than our production costs at that time, it will be necessary to reconsider whether it will be meaningful to cover all our uranium needs with our own uranium. Besides, our uranium needs for the period after 2000 are not clear yet, since it has not been decided yet whether more power plants will be built and how the fuel will be obtained for them.

[Fuk] Is it necessary to have the uranium processed abroad?

[Answer] Apart from the basic processing of uranium ore into the form of so-called chemical concentrate, no other processing of uranium is carried out in our country. When dealing with these problems, it is necessary to carefully consider how secure the previously accessible sources of fuel for the Soviet-type power stations are given the problems, mainly of an economic and ecological nature, that we would have if we introduced its production in our country.

### Nuclear Plant Construction Prospects

*LD2708200790 Prague CTK in English 1511 GMT  
27 Aug 90*

[Text] Prague Aug 27 (CTK)—Czechoslovakia has taken a course of complete frankness in questions of the further construction of nuclear power plants which means that all intentions and projects are judged with international experts and institutions participating, a Czechoslovak expert in nuclear power plant construction has told CTK.

Vladimir Novy of the Ministry of Economics Fuels and Energy Section said that technology for Czechoslovakia's future nuclear power plants will be decided on the basis of a competition with firms of world renown taking part. The Soviet VVER [water-cooled, water-moderated energy reactor] technology used in Czechoslovakia to date will take part in the competition but the choice will depend on the most favourable criteria for a given locality.

Besides the six nuclear power plants units now under construction (two 440 mw units in Mochovce and two 1000 mw ones in Temelin), further localities for nuclear power plants are being considered including Tetov in East Bohemia, Blahutovice in North Moravia and Kecerovce in East Slovakia. The draft is to be submitted for thorough discussion to the two national and the federal governments, Novy said.

**Bohunice Radioactive Leaks Said To Be 'Grave'**  
*AU2708084590 Bratislava NARODNA OBRODA  
in Slovak 20 Aug 90 p 7*

[Stefan Marusak article: "Half-Life of the Loss of a Feeling of Safety; The A-1 Nuclear Power Station Does Not Operate but the Risk Persists"]

[Excerpts] The V-1 nuclear power station at Jaslovske Bohunice has, in recent weeks, moved into the center of attention, not only of Czechoslovakia, but possibly of the whole of Europe. The V-1, however, is not the only nuclear power station at Jaslovske Bohunice. Jaslovske Bohunice is also the site of the more modern V-2 power station, and of the older, A-1 nuclear power station, which is unfit for use following an accident.

Speaking in the debate in the Federal Assembly's Committee for the Environment on 22 May this year, Deputy Pavel Sremer from Bratislava raised the problem of the damaged A-1 power station, saying that tritium, with a

volume activity [objemova aktivita] of 24,000 becquerel per liter, had been ascertained in underground water underneath the power station. [passage omitted]

Emil Bedi, doctor of natural sciences, head of the department for nuclear power stations at the Bratislava Regional Health Office, had this to say about this problem: "The problems at the decommissioned A-1 power station are extraordinarily grave. Tritium-contaminated underground water has been discovered on the premises, at a depth of 20 meters. The radioactivity level reached a volume activity of 24,000 becquerel per liter.

"Radioactive waste is deposited on the premises of the A-1 nuclear power station—in lid-covered containers which are practically unsecured. All kinds of hazardous chemicals have been stored in them for 20 years. As is becoming apparent, the construction barrier [stavebna bariera] is inadequate, and these substances are leaking into underground water resources. This, however, is only one of the possible sources of contamination.

"The crux of the problem is not the ascertained level of the volume activity of tritium, but the fact that we do not have the leakage under control. Our office is in charge of monitoring everything emitted from the nuclear power station. Our measuring devices monitor everything that flows into the Dudvah River, as well as all gaseous emissions escaping through the chimney."

The health officers do not yet know what level of activity is hidden in greater depths [below 20 meters] or closer to the surface. They do not know what levels were there in the past, or how long the underground water resources on the premises of the A-1 nuclear power station have been contaminated. It is quite possible that the levels of one or ten years ago were much higher.

The inspection of wells in the surrounding villages and near the Bohunice nuclear power station has not revealed any increased [radio]activity. In other words, there is no threat to the population for the time being.

What about the norm? Has the admissible norm been exceeded? [passage omitted]

"The norm is strange—it permits only one becquerel per liter," says Dr. Bedi. [passage omitted] "The permitted level of one becquerel (tritium) per liter is a value that is impossible to comply with. In drinking water we routinely measure values of the volume activity of tritium of between 10 and 100 becquerel per liter. A value below 10 becquerel per liter is, in fact, impossible to measure so that, in the case of tritium, the limit of one becquerel per liter is nonsense."

Besides tritium, strontium (which, like tritium, emits beta rays) and cobalt 60 (which emits gamma rays), too, have been ascertained in the underground water.

"In the case of cobalt 60," Doctor Bedi says, "we ascertained seven becquerel per liter. This clearly

exceeds the norm for drinking or underground water, and there is nothing to be discussed here."

The important thing is that no one has the emission of radiation under control, and that the emitters from underground water have not found their way into the statistical sheets, which are used in calculating the [radiation] doses received by the population....

The half-life of tritium, which is the heaviest isotope of hydrogen, is 12 years. This means that, in 12 years, the ascertained 24,000 becquerel per liter will be reduced to 12,000 becquerel, in another 12 years to 6,000 becquerel, and so forth. As can be seen, the level of radiation will be high even after 36 years. The half-life of cobalt 60 is five years.

"Substantially higher values than in underground water," Dr. Bedi continues, "have been ascertained in samples [of soil] in the immediate vicinity of the containers. This means that the starting values are much higher. We claim that the containers are not impermeable, but the user claims the opposite. He explains the high level of [radio]activity by the overfilling of containers in 1984. At that time, their content—a highly active liquid—ran out of the containers. Another cause was floods, which came from the fields and inundated the power station's premises. The true reason is hard to identify. It is undeniable, however, that there is activity near the containers and it is beyond our control. We, therefore, issued a ban on the use of the aforesaid containers, and ordered that all soil with radioactivity levels in excess of 100 becquerel per kilogram be eliminated." [passage omitted]

There are also other containers on the premises of the nuclear power station which contain solid waste. This waste comprises various contaminated articles, starting with parts of the fuel rod casings and ending with pieces of cloth used during deactivation. This storage place is flooded with water.

"The impermeability of this storage place is not guaranteed because the water level has fallen here," says Dr. Bedi. "We, therefore, issued an order to eliminate the contents of this storage place. It is impossible to do this manually, however, and the standard of machinery and automation in the A-1 nuclear power station is very low."

Ever since the accident (1977), highly radioactive waste—including spent fuel—has been stored at the A-1 nuclear power station. Some of the spent fuel rods cannot be taken out of the cassettes in which they have been stored and cooled; some of the rods have increased in volume, others have fallen apart, etc. The rods' casings will have to be cut apart and, unconditionally, taken away from the storage place because the storage depot is no longer useful. A crack in the depot's wall would result in an accident of a scale which Czechoslovakia has not yet experienced. At the same time, the high

level of radioactivity makes it impossible to conduct a check of the quality of the depot's welding seams. [passage omitted]

The cost of the liquidation of the A-1 nuclear power station has been estimated at 1.2 billion korunas. No other accident in Czechoslovakia so far has required a sum of such magnitude. At the same time, a detailed concept of the long-term liquidation of the A-1 nuclear power station has not yet been adopted. The A-1 has been out of operation for 13 years, but its liquidation could still take decades. [passage omitted]

I admit that, on leaving the nuclear power station at Jaslovske Bohunice a few days ago, I had a safe feeling. Conversations with representatives of the power station had a calming effect on me. Their rationally argued assurances that everything in the V-1 and V-2 power stations is under the control of knowledgeable experts convinced me.

My feeling of safety, however, did not last long. After the words of the health officer [Dr. Bedi] that the leakage of radioactive substances from the premises of the A-1 power station is not under control, my feeling of safety was reduced by half.

## GERMAN DEMOCRATIC REPUBLIC

### Thuringian Miners Strike, Stay Underground

LD0709093490 East Berlin ADN International Service  
in German 0806 GMT 7 Sep 90

[Excerpt] Gera (ADN)—Since 0600 Friday, some 5,000 Thuringian Wismut miners have occupied their mines. After the night shift, 2,000 miners refused to start work. They will remain underground until government and party representatives listen to their questions and provide answers. Other workers in the Schmiedeberg, Beerwalde, Drosen, Paitzdorf, and Aue Wismut mines are taking part in the action above ground.

Employees and employers are united on this issue. In a joint statement, the directorate general of the Wismut AG, the main executive of the Wismut industrial trade union, and the entire works council demand clear statements on the future of the enterprise before the end of September. Uranium mining has no future, as all those involved know. But its ending threatens more than thousands of jobs, an entire region is affected by it. [passage omitted]

### Nuclear Facilities To Close After Accession

LD3108180190 East Berlin ADN International Service  
in German 1725 GMT 31 Aug 90

[Text] Saarbruecken (ADN)—After the GDR's accession to the Federal Republic on 3 October, the GDR nuclear power stations will be shut down for security reasons. This was announced by Martin Bangemann, EC Commission vice president, on Saarland radio on Saturday.

"No transitional period has been planned for the area of nuclear power station-produced electricity", he said in the interview. It could not be justified "that such plants, which do not come up to our safety standards, continue to work." Bangemann expressed the expectation that any likely energy shortfall will be made up through a power link-up with the European Community.

Additional EC expenditures for agriculture and regional, structural, and social funds after GDR accession would amount to about 4 billion German marks [DM], Bangemann said. This would be offset by anticipated revenues from the GDR, such as turnover tax and customs duties of DM3 billion. This additional burden on the EC budget of DM1 billion accounted for only one percent of the total EC budget. "That is no problem," Bangemann said. He did not believe that the EC should panic because of this.

#### Low Radioactivity Near Nuclear Plants Reported

AU2908122690 East Berlin NEUE ZEIT in German  
24 Aug 90 p 1

[“W.H.-NZ” report: “Radiation Very Low”]

[Text] East Berlin—The measuring and supervision of the levels of radioactivity near nuclear power plants, in mining areas, and throughout GDR territory have yielded a satisfying result concerning the amount of radiation to which the population is exposed. This is said in the 1989 annual report on environmental radioactivity, in which the State Office for Nuclear Safety and Radiation Protection notes that the legally prescribed threshold levels have not just been observed but that actual levels were generally far lower.

At a news conference on topical questions of radiation protection, Eckhard Ettenhuber stated that no case is known in which the limits have been exceeded. The studies of the strain on the environment caused by natural and artificial radiation sources have shown, for instance, that coal power plants and nuclear facilities have the same values, measured in the millisievert system (mSv), which are 0.002 mSv or even lower. However, there is a certain pent-up demand concerning safety technology.

Radiation doses of 1.0 to 1.5 mSv per inhabitant per year, which is valid both for the GDR and the FRG, can be used for comparisons. The dose of radiation is illustrated even better if one takes into consideration that a thorax x-ray causes about two mSv exposure. Radiation levels do not exceed the limits in mining either. Nevertheless, for health considerations, research and investigation measures are carried out in old mining areas and bismuth processing facilities, where radiation levels were kept secret in the past.

#### Soviet SDAG Member on Uranium Company Withdrawal

AU2608160990 East Berlin NEUE ZEIT in German  
18 Aug 90 p 3

[Report on interview with Valentin Pavlovich Nazarkin, Soviet-German Joint Stock Company board member, by unidentified NEUE ZEIT reporter; place and date not given: "A Stockholder Quits—Exclusive Interview With a Board Member"—first paragraph is NEUE ZEIT introduction]

[Text] For the first time in the history of the Wismut [uranium] company, a Soviet board member of the SDAG [Sowjetisch-Deutsche Aktiengesellschaft—Soviet-German Joint Stock Company] has given a news conference. First Deputy Director General Valentin Pavlovich Nazarkin talked with NEUE ZEIT on the company's problems.

[NEUE ZEIT] Why is the USSR withdrawing from the company after 44 years?

[Nazarkin] Our government said last year that it does not need uranium from the GDR anymore. The Wismut company works on the basis of an agreement concluded on 7 December 1962, which is effective until 2000. For every five-year plan, a government report was prepared on the tasks, financing, subsidies, supplies, and prices; the last report was prepared in January 1986. The agreement will expire on 31 December 1990 and will not be renewed. The developments in the disarmament and nuclear energy sectors have reduced our uranium requirements.

[NEUE ZEIT] Are the costs too high for the USSR?

[Nazarkin] Since 1980, the production costs have been higher than the world market prices. Our two countries shared the profits and losses. On the world market, one kilogram of uranium costs between 35 and 70 Deutsche marks [DM]. We are not even close to being able to compete in this respect. Production in the Wismut company is too expensive, and the metal content in the mineral is too low.

[NEUE ZEIT] The uranium in the Erz Mountains was the only known resource worth extracting for the USSR after the war. What benefit did your country receive?

[Nazarkin] In the postwar years, we had the political task of breaking the U.S. nuclear monopoly. At that time, uranium was extremely precious. Every expense was, therefore, accepted. I am an old Wismut worker. I started here in 1951 as an underground worker in Annaberg and Johanngeorgenstadt. The resources are spent. The only resources left are in Drosen, and they will last until after 2000.

[NEUE ZEIT] Can a stockholder resign from a business just like that? What will happen to the capital and the basic assets?

[Nazarkin] At first, we will withdraw from the agreement on uranium production. The basic assets that belong to the Wismut will be given to the GDR Government free of charge. When uranium production has been closed down, the Wismut company will still have its second function of machine building and engineering.

[NEUE ZEIT] The radiation caused by Wismut is undoubtedly harmful to the people. Will the USSR help us improve the situation?

[Nazarkin] Radiation is an issue, but not for horror stories. Of course, we must act quickly. According to the latest estimates, the costs will be DM5.4 billion. Whether the Soviet Union will take part will have to be decided at government level.

## ROMANIA

### Nuclear Plant's First Reactor Operational by 1994

AU1408193490 Bucharest ROMPRES in English  
0828 GMT 14 Aug 90

[Text] Bucharest ROMPRES, 14 Aug 90—Mr. Cornel Cioara, director-general of the Nuclear Electric Central Directorate of the Electric and Thermal Power Department, estimates that the first of the five 700 MW reactors of the nuclear power plant of Cernavoda, under construction in cooperation with Canadian partners, will start producing in 1994.

Until 1989 works proceeded in a chaotic manner. It is only now that they are performed properly, he stated stressing that with the government's help problems were solved in the past three months that have been awaiting a solution for ten years, problems which have seriously prejudiced the finalization of the works on the plant.

## ARGENTINA

**Atomic Energy Chief Describes Nuclear Program**

PY2508014490 Buenos Aires *NOTICIAS ARGENTINAS* in Spanish 1240 GMT 24 Aug 90

[Text] Mendoza, 24 Aug (NA)—Manuel Angel Mondino, president of the National Atomic Energy Commission, has said that "the need to install a nuclear dump in Argentina could be justified within 30 years." He added that the country's uranium reserves will guarantee self-sufficiency until the year 2020.

Mondino said that during his term in office, he will seek to finish construction of the Atucha 2 plant, build a heavy water plant, and finish an extension for the enriched uranium plant.

Mondino told the LOS ANDES newspaper that "approximately \$800 million will be invested in finishing construction of the Atucha 2 plant in 1995." The construction will be financed by a German credit of \$200 million marks, funds provided by the National Treasury, and a Spanish credit of \$50 million, which is being negotiated.

Regarding construction of a heavy water plant, Mondino said it will be finished early in 1992.

He said there are around 8,000 tons of uranium in Sierra Pintada, Mendoza Province, and 3,000 tons in Cerro Solo, Chubut Province. These are the country's major uranium reserves.

"These reserves will guarantee our self-sufficiency until the year 2020," Mondino added.

He also announced that it has been decided to suspend the project to install a nuclear medicine school in Mendoza, construction of which is nearing completion, and to promote the creation of a diagnostic institute in the same province.

## BRAZIL

**Independent Nuclear Research Study Advocated**

90WP0129A Sao Paulo *O ESTADO DE SAO PAULO* in Portuguese 15 Jul 90 p 3

[Editorial: "Another Nuclear Adventure"]

[Text] Within the next few days the president of the Republic will probably decide the future of the Brazilian nuclear program on the basis of the report prepared by the Secretariat for Strategic Affairs. The report recommends completion of the Angra II power plant, reassessment of the cost of Angra III, and continuation of the parallel program currently being carried out by the Army and Navy. Implementation of these programs alone will probably absorb more than \$2 billion, not counting the cost of all the items in the nuclear program contracted

with Germany. It can be estimated that their completion—as proposed in the document—will cost somewhere between \$12 billion and \$13 billion! Even if there is no way to avoid completion of Angra II—which is considered to be a priority project necessary to meet the energy requirements of the Center-South region—the parallel program must be viewed from a different angle.

The authors of the document demonstrate good sense in their analysis of the situation of the two power plants under construction at Angra, but they are yielding to the old concept of "Mighty Brazil" in the part where they deal with the construction of reactors not intended to be used in the generation of energy for commercial purposes. In this area, the prevailing opinion is that the goal of technological independence established in 1968 should continue to be pursued.

President Fernando Collor de Mello will probably receive suggestions recommending that the Army build a reactor of the gas-graphite type that will use natural metallic uranium as fuel, and that the Navy continue the construction of pressurized-water reactors of 11 megawatts, 100 megawatts, and even larger capacity. The recommendations do not stop there: we should, they say, continue to develop reactors for testing materials, and special reactors that have as their objective not only the ground-based research but also the future Brazilian space program! The commission also recommended the construction of regenerative reactors and continuation of the efforts to master the entire atomic cycle. One gets the impression that the document was developed by two teams: one team that made a realistic evaluation of the program relating to completion of the two nuclear power plants included in the agreement signed with the Federal Republic of Germany, and another team that is preoccupied with the attempt to obtain technical and scientific independence and is entrusting the Armed Forces with implementation of this program despite the fact that everything should be under the control of Congress, as the Constitution requires.

What is being proposed, therefore, is an ambitious nuclear program whose actual cost is unknown to this day. No one has the slightest idea of how much has been spent on the research already carried out, but those funds would assuredly have been sufficient to expedite significantly the construction at the Angra II nuclear power plant, which is essential to meet the growing demand for electric power. In fact, the report does not clearly define the cost of the nuclear program proposed. It is estimated at something more than \$2 billion, but that is an extremely conservative estimate. If the recommendations contained in the 63 pages of the document being transmitted to the president are followed, we run the risk of repeating what happened in the case of the agreement with West Germany that provided for investments on the order of \$30 billion and for the construction of nuclear power plants. Nothing was done, nothing was obtained, not a single kilowatt hour was generated. Everything is delayed, because—as the document from

the Secretariat of Foreign Affairs itself acknowledges—there was no money. The same thing will unquestionably happen this time.

President Fernando Collor ought to stick to what is feasible and realistic. It is not possible—under the pretext of transforming Brazil into a nuclear power—for us to embark upon uncoordinated projects carried out by the Army and the Navy, even if under the control of Congress.

The Brazilian Nuclear Program outlined in the aforementioned document should be approved only in the part that relates to the fate of the two nuclear power plants: namely, the completion of Angra II and a review of the cost of continuing the Angra III project. As for the rest, the research institutes of the universities should be invited to prepare a realistic and *independent* study of what can and should be done in the area of nuclear power.

#### Argentine, Brazilian Scientists Urge Controls

90WP0129B Sao Paulo *O ESTADO DE SAO PAULO*  
in Portuguese 14 Jul 90 p 12

[Article by Angela Caporal: "Atomic Bomb Worries Brazilians and Argentines"—first paragraph is *O ESTADO* introduction]

[Text] The Brazilian Physics Association wants to find out if Brazil is already enriching uranium to make a bomb.

Porto Alegre—The Brazilian Physics Association (SBF) insists that Congress must investigate Brazil's nuclear program by appointing a committee of scientists and a team of technical experts who have access to the installations to measure the quantity and grade of enrichment of the uranium. "We want to show that by opting for nuclear submarines, Brazil is choosing a certain type of technology that could lead to the bomb," Luiz Pinguelli Rosa declared yesterday during the Symposium on the Nuclear Question that was held during the 42nd annual meeting of the Brazilian Society for the Advancement of Science (SBPC).

Pinguelli Rosa was the author of the paper "The Feasibility of Enriching Uranium in Brazil to Bomb Grade, and a Conceptual Project for a Nuclear Explosive," prepared by the SBF. The paper discloses that the Aramar Experimental Center—of the Ministry of the Navy—which already is enriching uranium to 20 percent can achieve the 90 percent that is necessary to build the atomic bomb.

The proposal for creation of the investigative committee has already been sent to Congress, but according to Federal Deputy Fabio Feldmann (PSDB [Brazilian Social Democracy Party]), "without pressure from the public it will be difficult to set up the committee." He believes that Congress will have to assume the responsibility for conducting nuclear policy, with advice from the

scientific community. "Otherwise," he declared, "we shall continue to witness a program that is conducted by the military and has a military connotation."

Roberto Rivarola, president of the Physics Association of Argentina, who was also present at the symposium, suggested the establishment of reciprocal controls between Brazil and Argentina over the nuclear technologies used by the two countries. "We believe that Argentina's present policy is one of peace," Rivarola said, "but we must establish guarantees, and to this end it is beneficial to have mutual collaboration and inspection." Argentine and Brazilian ecologists, meeting yesterday at the SBPC [Brazilian Society for the Advancement of Science], made public a manifesto advocating that "in the development of nuclear technology no further steps be taken in connection with military preparations."

#### Carvalho Views Parallel, Argentine Programs

90WP0132A Brasilia *CORREIO BRAZILIENSE*  
in Portuguese 23 Jul 90 p 6

[Interview with Jose Luiz de Santana Carvalho, president of the National Commission for Nuclear Energy, by Alexandre Torres; place and date not given—first five paragraphs are *CORREIO BRAZILIENSE* introduction.]

[Text] Rebelliousness has always been a strong characteristic of the personality of chemist Jose Luiz de Santana Carvalho. During the 1960's, when the world was trying to break the taboos that controlled society and the hippie movement was riding high in the United States, there he was with his ponytail, earring, and pacifist and environmentalist ideas—a little unusual in those days. A lot of years have gone by since then, much has changed, and some habits have been abandoned, except the jute bracelet he wears on his left wrist and the rebelliousness.

Today, at age 39, dressed in a well-tailored suit and cultivating other habits such as smoking a good Cuban Montecristo cigar and occupying an office on the first floor of the Planalto Palace annex, this man is directly responsible for administering the Brazilian Nuclear Program.

In only three months as president of the National Commission for Nuclear Energy (CNEN), many of the ideas he used to defend, and which had been jettisoned by previous administrations because they did not want to seem to be kowtowing to anyone, are now being put into practice. One of them, perhaps the main one, is the visibility of the Brazilian nuclear program. The challenge of trying to bring the public closer to something that until a short time ago was considered "secret" would seem to be formidable, but it does not bother this scientist at all. He believes that "ignorance is what breeds fear."

Nuclear bomb—no way, although he acknowledges that Brazil already has the talent to build one. A confirmed ecologist, he may leave many defenders of Mother

Nature open-mouthed with surprise when he says that nuclear power is the cleanest, the "greenest," and the most ecological of the world's energy sources.

Between now and the end of August he will turn over to the government of Goias State the technical studies for building a storage facility for the radioactive waste inherited from the tragic cesium incident. The plans employ Italian technology, the most modern available. Whether the facility is built will, he says, depend solely on the Goias government's political courage and on whether greater pressure is exerted by the citizens of that state.

[Torres] What is the future of the Brazilian nuclear program?

[Carvalho] Before we talk about the future, let us talk a little about the present, so that we can map out what I believe the future will be. First, we are dealing with a highly sophisticated technology that had what you might call a bombastic beginning—when the two bombs were dropped on Hiroshima and Nagasaki that announced to the world what sort of technology it was. So that was a dramatic way to begin. In terms of energy, it is the only energy source developed during this century. Since all the others were developed during the last century or earlier, our knowledge about employing energy dates way back. In the case of the nuclear field, it is much more recent. The Brazilian nuclear program was rather diffuse and sort of murky to the great majority of society, even to CNEN personnel.

[Torres] But why was that?

[Carvalho] Well, that is a problem in technological development. During the past 10 years, the CNEN and the Brazilian nuclear program went through a much more internal process, trying to develop technology. We were experiencing—it is a lengthy process—international pressures that hampered our development of this technology, and so our alternative was to develop that technology independently. That is why we turned inward. We were trying to maintain a degree of secrecy that, in my view, might even have been somewhat exaggerated. I think we could have developed the technology a little more openly, so that the public could understand what was being done. We succeeded in developing much of the most sensitive technology, which is uranium enrichment, and that brings us the technological independence to be able to use it properly. That concept of "properly" is also associated with the transparency and openness of the program, i.e., if we discuss the Brazilian nuclear program with society, with the greatest possible transparency, then the public will be able to understand what is being done, and even accept it.

[Torres] Using this transparency you keep talking about, I would like to know which sectors the Brazilian nuclear program will focus on?

[Carvalho] This technology has an extremely wide variety of applications. For example, it can be used not only to generate electricity as we are doing at Angra I—which is now functioning very satisfactorily; in fact, a CNEN team is stationed there to constantly monitor it and I receive a status report every day at 1600 hours—but even medical applications. Nowadays, if you are going to get your heart checked, you will certainly need to use nuclear technology—I mean, you are going to use radioactive material that will produce a map of your heart, and the doctor will be able to make a diagnosis on that basis. There are all sorts of possibilities in internal medicine—even the growth hormones we announced three or four weeks ago. CNEN has developed growth hormone, which will be manufactured on an industrial scale in Brazil beginning next year, and it is synthetic—it is not from the human pituitary gland, where you get into the ethical aspects, because there can be a latent virus within that human gland and it could be transmitted, like the Aids virus which can be transmitted through the pituitary gland. So, since you make the material by synthetic means, you avoid the ethical aspect and also the health aspect, and in this case you can put a product on the market at a price much lower than the price of the imported product—even now that import restrictions have been lifted—and it is going to help a whole flood of patients. There are more than 30,000 children registered with INAMPS [National Institute for Social Security Medical Assistance] who need that material, and so you reap a social benefit. But CNEN got into the growth hormone business because the inputs we use in the nuclear programs are the same ones used to make growth hormone. So if you have the inputs, the next technological step is to develop the hormone and get something that will benefit society. These are peaceful uses of nuclear energy. So you have all that range of products—metallic alloys, mining, phosphor sulfur, irradiation of electrical cable—that Brazil did not have, that it had to import.

[Torres] So you think that the Brazilian nuclear program got off on the wrong foot. Was the reason for the absence of a certain transparency as regards the public the tendency for people to think only of Hiroshima and Nagasaki when someone talks about the nuclear program?

[Carvalho] Perhaps we got off on the wrong foot as regards the form, not the content, because the Brazilian nuclear program is of very long standing. It dates back to the 1950's. There was a period during the 1980's when things were hermetically sealed. So that phase attracted attention, everyone wanting to know what was going on. It is only now, under the Collor administration, that transparency—and furthermore, civilian control—have become guiding principles of the Brazilian nuclear program. Now we have a secretary of strategic affairs and a president of the National Commission for Nuclear Energy who are civilians. Therefore, all the projects are technically controlled by the CNEN.

[Torres] But don't we have a parallel program run by the Armed Forces?

[Carvalho] That so-called parallel program, the autonomous program, is focused on the aspect of 1980's secrecy. Today not even that, in my opinion, exists any more, because when the president set up the interministerial working group, well, it is all right there in the decree—there must be openness in the discussion. So, all the projects have been discussed openly. That has had repercussions even on the international level. This is quite a development, because countries that used to block us economically or technologically are no longer doing so. They are softening their positions, and significantly so. We have only to note that the United States has sold a supercomputer to Brazil under this administration. Our experts were sometimes banned from getting training in some countries; now they are being accepted. The change in the posture of the Collor government brought about an immediate change in the posture of other governments. In our relations with Argentina which is, you might say, a measuring stick—in the meeting that we had three weeks ago, things went so well that we agreed on timetables for the exchanges. That is not customary in the nuclear area, where no one opens up anything to anyone.

[Torres] But the Argentine nuclear program is inferior to ours, is it not?

[Carvalho] No, in many areas it is more advanced than ours. Just as ours is more advanced than theirs in other areas. For example, we are doing well in enrichment, but in building nuclear power plants they are better than we are. They have reactors which they built themselves; we do not. Now, we have technology and human resources; political will is all we lack, but opening up the program is also a way to garner political support so that we can achieve completeness in every aspect.

[Torres] Does a parallel program still exist now, at this point?

[Carvalho] I would say no, because if the president says that all the programs have to be technically coordinated by CNEN, then as I see it, the concept of the parallel program no longer exists. As a scientist, I would never prohibit any sector of society from participating in anything. To me, what is important is that people join efforts so that we can develop the thing properly. So I am not going to prohibit a military man or a civilian, or a political party from participating, provided that they come in with intentions that are guided by the Brazilian Constitution.

[Torres] Have you already sensed some desire on the part of the military in that area?

[Carvalho] Yes, to such an extent that we have 300 CNEN employees working on a so-called parallel program—I prefer to call it an autonomous program. It is a Navy-CNEN program, because there are 300 CNEN employees actively involved in the development of that

technology. The same is true of the other programs in which the Army and the Air Force are involved, and the programs that involve universities, hospitals, etc. What I mean is, there is an obvious symbiosis of interests between the Navy and the CNEN. The Navy has included a nuclear-powered submarine in its programming for the year 2000, so this means they need a reactor. And the CNEN also wants to develop a reactor. So you have a this mutual interest of the Navy and the CNEN to develop these reactors. I have not felt any resistance. In fact, I would be hard put to cite an example of any resistance from the military toward the new government posture—far from it. A certain military minister made a proposal and I used part of his proposal in our negotiations with the Argentines. I suggested a visit to a certain facility that is administered by that military minister within the Brazilian nuclear program that is coordinated technically by the CNEN. So that military minister opened the installation up to a visit by the Argentines. That is one part of the proposal; I asked for time to think about the rest, because it is pretty advanced, even for me.

[Torres] Once again, using that frankness and transparency that the administration is trying to adopt—which I would even characterize as respect for civilian society—is Brazil building its nuclear bomb or not?

[Carvalho] That was something that used to worry me, and that was why in the past I wanted to see a debate on the program, because I was apprehensive, even as a CNEN official, that we might perhaps be moving in that direction, especially because I am philosophically opposed to it. And it is something that goes strongly against my beliefs, and if that situation existed today, I assure you that I would not be here. But so far I have not seen anything that would point in that direction. I would like to be able to pass on to my children a world that is at least as good as, if not better than, the world I was given. Better would be the ideal, and to me, that means a world without armaments, including nuclear ones. I gave an interview in which I said: nuclear bomb—no way! And my six-year old son read it, and his mother explained some things, so he telephoned me. That was very moving; to think that a six-year old boy could understand the idea that I was trying to get across in that interview. No way.

[Torres] But does Brazil have the ability to build one, using the technology already developed?

[Carvalho] In terms of human knowledge, we have the capability to do the calculations, but to make one, to assemble one—no. If I give one of my graduate students a test and he does not do the calculations he will fail the course. That is elementary.

[Torres] Any country that thinks about carrying out a nuclear program automatically plans for the building of a nuclear bomb. Is that because it gives a country some sort of status in the world?

[Carvalho] In discussions, as I said, we do that. In the past, during the 1980's when I had that concern, I began to study a lot on nuclear military strategy. Nowadays there are very few people in Brazil who can converse on the subject. When that film, "The Day After," came out, you would not believe some of the nonsense I heard from my colleagues. They did not have the least notion of nuclear strategy. You send a political message when you do that, and the tendency in the world today is to distance oneself from that. You see that the walls in Eastern Europe have fallen, and that there is a relaxation of international tensions. Those tensions are what lead to the manufacture of nuclear weapons of war. If the world is moving toward a relaxation, embarking on the road to peace, it would be swimming against the tide to build nuclear weapons. The U.S. ambassador for nuclear affairs was here a month ago and soon afterward I talked to him about what we are going to do here in Brazil. Starting in the second half of this year, CNEN is going to hold a much more fundamental debate, a much more important one, that deals with the human values that we have—a debate on morals and nuclear ethics. If we debate the basic assumptions, if we decide on the basic aspects, the instruments will not be necessary.

[Torres] What is CNEN doing to inform the public? Is there some specific program that does this?

[Carvalho] We are now in the planning stages as regards releasing information on the nature of nuclear technology. Monitoring it more closely is our priority—a corrective and punitive monitoring process. We went so far as to close down a company until it starts following CNEN rules. We conducted an inspection at Aramar, we took the press with us, so that the media could actually witness an inspection at a facility, even a military one, which is not at all different than a civilian one. Next week, for example, we will conduct inspections at two Brazilian universities. We want the people who deal with that technology to handle it correctly. We have had 20 or 30 years of great confusion in the nuclear area, so now we are trying to clean things up, modernize the administrative mechanisms, and provide more training in those areas that are crucial, such as supervision. We are reviewing all the legislation that has to do with nuclear activities.

[Torres] Perhaps—I would like you to confirm this—it was the cesium accident in Goiania that led the CNEN to start thinking about all this? To straighten itself out, to get back on track?

[Carvalho] The accident in Goiania involved a radiation therapy device, and the responsibility for inspecting that equipment did not lie with CNEN, but with a state agency and with a different ministry. However, as soon as the accident occurred, it came under CNEN's jurisdiction, as does the future storage site in Goiania, etc. The law is unclear on that point. But CNEN has the

moral—not the legal responsibility—to attempt a solution. That is why we are in contact with Italian scientists, so that we can use their technology to build nuclear waste storage sites.

[Torres] What is it about that technology that interests CNEN?

[Carvalho] There are several aspects of it that interest us. One is that their technology would considerably reduce the volume of the material there. The other is that it encapsulates that reduced volume of material, and that is very good. They use a special kind of steel that does not let the radiation leak out in intolerable quantities. The structure itself, which features pre-stressed concrete with various layers of concrete to filter whatever radiation might come out, is something that resists major geological events.

[Torres] How does the CNEN stand with the ecologists?

[Carvalho] I was trained at a time when people were just beginning to talk about all that. I was educated at a university in California where many of the things that are being done in the nuclear field were developed. And so I lived with all that from the beginning. I was very well aware, so much so that when I came back to Brazil and began to do research, I chose as my field the application of nuclear techniques in studies of environmental pollution. Now you have a whole field of research devoted to environmental pollution. I am very concerned about the environment. My specialty, within the larger field, is mercury poisoning. Mercury was the very first big source of pollution that we heard about. So I personally am very concerned about the environment, even at the research level. What we are seeing today, all over the world, is that when people campaign very heavily against the use of nuclear energy in electricity generating plants, then you have to settle for something else, the coal-fired plants, etc. And the threat to the environment has increased considerably. So we saw several nuclear programs stopped in Europe, like in the case of Sweden. But Sweden began buying nuclear-generated electricity from Germany. So it is a little strange: I do not produce it, but I buy it. However, those countries that purchase electricity have begun to depend on other countries for their energy. The competitiveness of their industrial products has begun to depend on other countries, and that competitiveness has started to decline, we are starting to see higher unemployment, a drop in the productivity of those countries, and so the penetration of their products on the world market is no longer as great. So then they started to reevaluate this, as the safety systems in place at the power plants were becoming increasingly refined, and today the cleanest energy is nuclear energy. Of course it produces nuclear waste, which has to be much more carefully controlled.

[Torres] I would compare it to an airplane. The airplane is the safest mode of transportation in the world today, but when there is an accident, it is catastrophic. Look at

Chernobyl. Do you think there is any way to control that properly? Is it possible to prevent such accidents?

[Carvalho] In the case of Chernobyl, the reactor—that kind of reactor—was an accident waiting to happen. It really is dangerous, because it is an open reactor. At the time of German reunification, one of the first things they did was to conduct a review of the nuclear reactors in Germany so that today's nuclear safety systems can be installed. Austria is forbidden to build a nuclear power plant, but next door is Czechoslovakia, which has four Chernobyl-type power plants built with Soviet technology.

[Torres] So our nuclear program is being carried out within the framework of a safe technology. Does Brazil really need to take the nuclear energy route? Wasn't that just another whim of ours?

[Carvalho] We have to develop responsible technology. Brazil needs to develop nuclear technology, just as it must develop any other technology. We cannot cut ourselves off from access to any technology. You saw that when I talked about nuclear energy I talked about the growth hormone. In the area of health alone, there is an enormous range of products, just as there is in agriculture where such things as seeds and snakebit antidotes can be improved using nuclear technology.

[Torres] When do you think the president will make a decision on the new program you submitted to him?

[Carvalho] I don't know, that is entirely up to him.

[Torres] But the program is based on these peaceful uses, is it not?

[Carvalho] Totally. In fact, early in the life of the working group we had a meeting with him. He looked us straight in the eye and said: "I do not want any violations of the Brazilian Constitution."

#### FRG Shifts Focus of Accord to Safety

90WP0132B Rio de Janeiro *O GLOBO* in Portuguese  
13 Jul 90 p 16

[Article by Fanny Zigband]

[Text] Porto Alegre—Germany is trying to renegotiate its nuclear agreement with Brazil, by offering technology and training in reactor and power plant safety and the monitoring of radioactivity in the environment.

This statement was made yesterday by Horst Dieter Talarek, coordinator of the Brazil-Germany Bilateral Cooperation Program and head of the International Office of the Jülich Research Center (KLA), operated by the FRG's Ministry of Science and Technology.

According to Talarek, who came to Brazil at the invitation of the Brazilian Society for the Advancement of Science (SBPC), the proposal was formally submitted to the Brazilian Government about two months ago in a

letter of intent to the president of the National Commission for Nuclear Energy (CNEN).

Talarek said that German physicists associated with the FRG Government made a very detailed, thorough appraisal of the current status of the Brazil-Germany Nuclear Accord and Brazil's needs in this area. They concluded that providing the technology for nuclear facilities safety and monitoring would be the best route to follow in order to reactivate the cooperation between the two countries in that field. Cooperation arrangements have been dormant since Brazil developed the Parallel Nuclear Program, and were suspended when President Fernando Collor took office.

Under the protocol sent to CNEN, the German Government proposes that joint projects be conducted at KFK—the German research center based at Karlsruhe and responsible, late in the 1970's, for training Brazilian physicists—and at the Center for Development of Nuclear Technology in Belo Horizonte.

The principal objective of the program, according to Talarek, is to analyze flaws in the reactor systems and to build mathematical models and computer programs that could prevent nuclear accidents. Talarek avoided criticizing the way in which nuclear activities are being carried out in Brazil, but observed that not having such technological resources is potentially risky.

According to the official, the proposal also includes German assistance in locating and building nuclear waste storage sites.

#### Nuclear Fuel Element Production Process Mastered

PY2108195390 São Paulo *O ESTADO DE SÃO PAULO* in Portuguese 18 Aug 90 p 16

[Report by Cilene Pereira]

[Text] The Institute for Energy and Nuclear Research (IPEN) is now able to produce, in series and using completely national technology, the fuel element that is essential for running its nuclear reactor. This was announced in São Paulo yesterday by physicist Spero Penha Morato, the IPEN superintendent. The mastering of this manufacturing technique guarantees Brazil's full autonomy in the production of radioisotopes for use in medicine and industry.

Four of the 32 IPEN reactor fuel elements were manufactured in Brazil. They consist of groups of approximately 70-centimeter shields made up of a sandwich of two aluminum plates filled with an aluminum alloy mixed with 20 percent enriched uranium. Morato said: "In 1988, we produced the first Brazilian-made fuel element but only now have we been able to build the entire production line."

Because of limitations on IPEN on the import of fuel elements since 1982, the institute has been compelled to

research ways to manufacture fuel elements used in Brazil. Meanwhile, IPEN economized on the existing fuel elements.

Now that it commands the fuel elements manufacturing process, IPEN hopes to increase the operation of its reactor from eight hours per day at two megawatts output to operating the reactor 24 hours per day at five megawatts. Morato added: "Once we are certain we can manufacture the fuel elements in Brazil, we will be able to increase the output of the reactor and begin to supply radioisotopes to the entire local market."

Nevertheless, only half of the national demand for radioisotopes is filled by IPEN, which is the only Brazilian supplier of these elements. The other half continues to come from abroad. IPEN believes that Brazil spends about \$4 million (288 million cruzeiros) per year on imported fuel elements.

Medical radioisotopes are used to isolate some kinds of degenerative tissue, to produce graphs, and in local radiation treatment of tumors or other illnesses. In July, IPEN sold about \$14 million-worth of assorted radioisotopes to Brazilian hospitals and doctors.

Encouraged by the success obtained with the manufacture in series of the two first fuel elements, Morato hopes to produce one fuel element per month as of August. In 1991, the objective of IPEN is to manufacture two fuel elements per month.

Very enthusiastically, Morato added: "We will build up a good stock".

To achieve these objectives, IPEN will need about \$3.5 million (242 million cruzeiros) with which to update the reactor. "This way we will keep our independence" added Morato.

### Nuclear Reactors for Satellites Studied

PY2708134490 Rio de Janeiro *O GLOBO* in Portuguese  
26 Aug 90 p 48

[Text] San Jose dos Campos—Brazil could well use nuclear energy as an energy source for its future satellites. The research is being carried out by the Institute of Advanced Studies (IEAv) using the guidelines of U.S. studies. To date no positive results have been obtained.

The research was started in 1981 from a theoretical concept and laboratory experiences. Colonel Reginaldo Santos, the director of the IEAv, has reported that they aim to develop a laboratory model within five years. This mininuclear reactor will be studied by aeronautics scientists, but it will be manufactured by the Energy and Nuclear Research Institute (IPEN) and it will function like a nuclear plant in that it will generate enough heat to produce steam which will drive a turbine.

According to Santos, this technology produces the best results: A compact reactor that occupies a very small place, does not weigh much, produces a few dozen

kilowatts of power, and it can be used for several years to move the satellite in orbit and feed all the systems that depend on electricity to receive, process, and transmit information. With this mini-reactor there will be no need to use large solar panels on the satellite which quickly lose their efficiency due to space particles and radiation.

### Nuclear Reactors for Remote Sites Under Research

PY2708161890 Rio de Janeiro *O GLOBO* in Portuguese  
26 Aug 90 p 48

[Report by Jose Eustaquio de Freitas]

[Text] Sao Jose dos Campos—Brazil is going to use nuclear energy as a source for generating electricity for a series of radar and telecommunications repeater stations that are installed remote sites, like the Amazonia, Pantanal, center-west regions, and distant islands.

The stations will receive electricity from a thermal-electric generator that will be fed by reprocessed waste, such as plutonium, from nuclear plants whose radiation lasts for 30 years but which have low penetration and can be isolated easily.

The project to develop these generators is part of a joint task that has been outlined by the Institute of Advanced Studies (IEAv), an Aeronautics Ministry organization that is linked to the Aerospace Technical Center (CTA). The National Nuclear Energy Commission (CNEN) has included this task in the project to restructure the Brazilian nuclear program that will be submitted to Congress. This program also includes finishing the linear electron accelerator, an expansion of the Nuclear Data Center, and the development of the thermal-electric radioisotope generator.

Colonel Reginaldo Santos, the IEAv director, estimates that the first generator tests will be carried out in 1993 and that this part will require an investment of \$300,000 a year. It is estimated that the equipment will be available within a maximum of 10 years.

Santos said: "Our major difficulty will be to obtain fuel because Brazil does not have the means to reprocess nuclear waste and it will be very difficult to find a country that will sell us that type of materiel, which is very costly, very difficult to obtain, and its sale is controlled."

The alternative is to obtain small quantities of fuel through the Energy and Nuclear Research Institute (IPEN) in Sao Paulo, where a reprocessing system exists at the laboratory level. Santos believes that Brazil will have to quickly seek nuclear reprocessing technology because this will help to obtain fuel, preferably Plutonium 238, Strontium 90, or Curium 290, for the generator. These radioactive materials only emit alpha and beta radiation, which have a small penetration, not like the Gamma radiation that is emitted by uranium. It can

be easily contained with simple shields because this type of radiation cannot penetrate a piece of paper [as published].

The reprocessed materiel is placed in the generator where it produces heat naturally through radioactive disintegration. In other words, radiation is slowly freed and loses energy. This energy is in the form of heat which is then transformed into electricity.

The use of these generators will eliminate the need for routine maintenance in the electrical part of the radar installation or telecommunications repeaters because nuclear sources generate energy for many years. For example, the chemical content of Plutonium 238 takes 18 years to lose half of its radioactivity. The Air Force believes that it will be necessary to install dozens of repeater stations in the Amazonia so that the region will be effectively covered by radar in order to protect its air space, and it would not be feasible to do routine maintenance if diesel oil generators were used.

The IEAv has a group of scientists working on the idea of these generators with a maximum power of 100 watts, another group studying the building of a mock up, and a third group researching the materiel that will be necessary to manufacture the equipment. The main difficulty lies in the definition of the material that is to be used because thermal protection that can withstand temperatures above 600 degrees centigrade is required. The scientists' first choice is to use ceramic materials that are being researched jointly with the San Carlos University in Sao Paulo State.

The IEAv guarantees that in addition to being durable and economic, these generators are completely safe and they do not emit radiation that can harm the environment.

### Official Says U.S. Withholding Rocket Motors

#### Space Program Delayed

PY2708145290 Sao Paulo *FOLHA DE SAO PAULO*  
in Portuguese 24 Aug 90 p A5

[Report by correspondent in Sao Jose dos Campos]

[Excerpts] Lieutenant Colonel Tiago da Silva Ribeiro, 45, president of the Space Activities Institute (IAE), said yesterday that the U.S. Government is withholding in that country the structures [estruturas] of seven motors from the Brazilian Satellite Launching Vehicle (VLS) and is thus delaying the development of the Brazilian space program. According to Ribeiro, the motors have been delayed in the United States by orders of the U.S. Department of State since the end of last month. [passage omitted]

The budget for this year's rocket program has already been used up. The money that was received in March was totally spent by July. The Brazilian Commission for

Space Activities (COBAE) is negotiating a budget supplement of 150 million cruzeiros to continue the project. The IAE has so far received only the equivalent of one-fourth of the 1.5 billion cruzeiros that it requested for 1990.

The prospects for 1991 look even worse. Congress is scheduled to discuss the approval of a budget barely covering 15 percent of the money needed for the VLS program in 1991. The project should cost over \$150 million before its conclusion at the beginning of 1994. The Brazilian satellite is scheduled to be launched by a foreign launcher before then. According to Lt. Col. Ribeiro, the launch should cost between \$18 million and \$20 million.

#### Arms Supply Conflict Viewed

PY2808180690 Sao Paulo *O ESTADO DE SAO PAULO* in Portuguese 25 Aug 90 p 3

[From the "Notes and Information" page: "A Difficult Problem for Collor"]

[Text] The export of military equipment is a major foreign policy issue that President Fernando Collor has inherited from previous administrations. The matter involves the situation of the military supply industry, which directly affects the Brazilian Armed Forces, their doctrine for the use of troops, and their relations with civilians in the sector that could be called the "industrial-military complex."

This is a very delicate problem because it entails, in the first place, what could be called the Brazilian military doctrine. This doctrine suggests (and we say suggest because to a considerable extent it remains unknown to the public and even to Congress) that it is not necessary to maintain the Armed Forces in a state of readiness for combat, but only to have the industrial capacity to supply them and to train them in case of a conflict. This doctrine has forced the Brazilian military industry to search for markets abroad, in which it could compete with the major and traditional suppliers of sophisticated or nonsophisticated equipment that could be purchased by Third World countries. Many of such traditional suppliers are western countries. The struggle to conquer markets has been hard, and the fact that the Brazilian military industry has opened markets in areas that the United States considers "dangerous," has strained Brazilian-U.S. relations. To put it clearly, relations also have been strained by the fact that the Brazilian Government has thus far adopted a dubious position regarding arms sales: When regarded as a simple and purely commercial transaction, the matter has been considered exclusively as pertaining to private companies. Like this the government cannot take any action, except to veto transactions that violate United Nations resolutions or that do not comply with a policy that is known to just a few people. However, whenever the United States has protested the fact that private companies are selling arms to countries that are considered "dangerous," the Brazilian Government has defended such transactions on sovereignty

grounds, claiming that the world is divided into rich and poor countries, or even the Araujo Castro doctrine on the Soviet-U.S. joint dominion.

This is the background that should be taken into account to consider the U.S. Government decision to confiscate components of Brazilian rockets, in U.S. territory. The corresponding contract, which was signed with a private U.S. company, was canceled in May 1990 when there were no remote indications of the Iraqi conflict (the date of the decision to confiscate the components is unknown). This shows that the U.S. decision was not made within the framework of the U.S. defense policy or to comply with United Nations resolutions. Instead, the decision was made within the framework of the U.S.-Brazilian conflict, which this measure has aggravated [preceding word in italics]. The matter is even more delicate, because it is part of a set of actions that the U.S. Government has taken to prevent the proliferation of (chemical or nuclear) warhead carriers of any range, with launching bases in this hemisphere or in countries that are considered "dangerous."

The contract was canceled in May. The decision to confiscate the components followed thereafter. On 11 June, in a report to the House Arms Control, International Security, and Science Subcommittee, Richard Clarke, assistant secretary of state for political-military affairs [name and position as published] said nothing on the subject. He mentioned, however, the Iraqi efforts to produce a large warhead carrier with its own technology or with technology purchased from the Argentines and from the Egyptians in the Condor II rocket. Clarke said that the United States had some success in delaying the development of the Condor in both countries. As for Brazil, Clarke simply mentioned press reports and said: "The Brazilian Government has indicated that it is investigating the situation," that is, into Brazilian involvement in the development of rockets to be used by Iraq. Clarke's briefing took place in June, when the Collor administration was already in power.

The U.S. concern about Brazilian programs and projects, however, went even further. On the same day, in a briefing to the same subcommittee, Brad Gordon, assistant director of the Nuclear and Weapons Control Bureau of the United States Arms Control and Disarmament Agency, was more explicit: "We hail the guarantee that Argentine President Menem has given that the (Condor II) program has been suspended. In Brazil, parallel missile and space rocket launching programs continue. Recent high-level diplomatic talks on proliferation problems, however, indicate that there are possibilities for making progress."

Therefore, one of the following may have happened: either the Brazilian Air Force and Itamaraty were not aware of the cancellation of the contract in May—even after the confiscation that the U.S. Government ordered without apparent reasons—or they preferred to remain quiet. Anyway, that drastic decision has been made

known only now. This reveals that either the U.S.-Brazilian conflict has been further strained, or that "high-level diplomatic talks" have failed. It is important to know now whether Washington wants clear definitions from the Brazilian Government regarding the missile and rocket program, regarding the Brazilian stance toward the situation in the Persian Gulf, or regarding what Brasilia wishes and is able to do as a contribution, however symbolic, to the military effort in that region.

If Brazil actually wants to join the First World and if it wishes to be heard by the "most important countries," it will have to assume the responsibilities that must be discharged despite the fact that its strategical resources are insufficient for an extra-continental action.

#### U.S., France, U.K. Boycotting Space Program

PY2308161290 Rio de Janeiro *O GLOBO* in Portuguese  
17 Aug 90 p 18

[Report by Jose Eustaquio de Freitas]

[Text] According to Aerospace Technology Center (CTA) sources, the U.S., French, and British Governments are openly boycotting the Brazilian space program and have ordered an embargo on some items, including parts manufactured in Brazil and sent to the United States for final thermal insulation. The boycott is based on an agreement signed in 1987 by the seven developed nations to prevent the export of sensitive material that can be used to manufacture missiles.

Contracts on the embargoed items were signed with private companies, and the Brazilian Aeronautics Ministry provided them with guarantees that the items would be used only in mounting the Satellite Launching Vehicle (VLS), which is being developed by the CTA. The Brazilian Government also signed end user certificates to guarantee that the items would not be reexported to a third country. The embargo will cause more delays in the Brazilian space program and will prevent the VLS from being assembled by 1993.

Colonel Roberto Kessel, director of the CTA Institute for Research and Development, believes the boycott was not prompted by either political or military reasons. In his opinion, the developed countries are seeking to prevent the entrance of new competitors in the market of services for space technology. He believes Brazil could collect between \$8 and \$10 million per launch at the Alcantara Base in Maranhao State, which has a privileged location near the equator, while foreign rocket launchers would charge more than \$20 million.

The most serious boycott was ordered by the U.S. Government 30 days ago. This action has resulted in the confiscation of a set of parts, supplies, tools, and machinery belonging to the CTA. It consists of nine pieces valued at more than \$300,000, most of which were manufactured in Brazil and sent to Lindberg Industries in Los Angeles for heat insulation. The package includes four pipes—one meter in diameter and six

meters long—for the first stage of the VLS; one pipe of the same size for the second stage; and two four-meter long pipes that would be used for mounting the Sonda-4 rocket.

The pipes are made of 300M-type [as published] steel, which is highly resistant. Because of their large size, there are no facilities in the country capable of insulating these pipes against heat so that they can resist high temperatures. Lindberg Industries provided similar services in the past by insulating pipes used by the Sonda-4 rockets already launched by Brazil. The pipes are being held by the U.S. Department of Defense.

The CTA and the Foreign Ministry have unsuccessfully contacted the governments that ordered the boycott. The most recent contacts were with U.S. Air Force Major General Robert D. Eaglet, who promised to try to obtain the release of these parts.

The current stage of embargoes began last year when Great Britain prevented the Royal Ordnance Company from delivering a number of supplies the CTA needed for setting up the booster system to disengage VLS stages. Another serious boycott was ordered by France, which banned the sale of an inertial guidance platform; that is, an automatic pilot device for the flight and an altitude control system for the rocket.

## CHILE

### Nuclear Cooperation Agreement Signed With Argentina

90WP0152A Buenos Aires *LA PRENSA* in Spanish  
5 Aug 90 p 3

[Text] Santiago (ANSA)—An agreement establishing new and more extensive types of cooperation for the peaceful use of nuclear energy was signed here by the top-ranking representatives of the respective Chilean and Argentine commissions.

The agreement was signed by Manuel Mondino, chairman of Argentina's National Commission for Atomic Energy, and Sergio Lorenzini, chairman of the Chilean Nuclear Energy Commission.

The agreement is aimed at giving an impetus to the application of nuclear technologies in the field of medicine, and in industry and agriculture. The main benefits are expected to affect areas such as radiopharmaceuticals, fruit fly control, radioisotopes use, food conservation, materials evaluation, and electricity generation in nuclear power plants.

The binational agreement improves a previous one of 1976.

Lorenzini stressed that Argentina has achieved major development in this field over a 40-year period, while Chile has experience in the use for radiopharmaceuticals and mining.

The official noted that Chile has not considered the construction of a nuclear power plant, because it is accruing advantages from hydroelectric power plants. Nevertheless, he pointed out that the latest studies indicate that a nuclear power plant could prove economical by the beginning of the next century.

Lorenzini commented: "We are preparing for the time when we shall consider a nuclear power plant economical in Chile."

Mondino observed that Argentina is seeking greater "social prosperity" through the application of atomic energy. He cited as an example irradiation with gamma rays to sterilize animals and to control the fruit fly, which has enabled his country "to export and maintain the good quality of its products."

As for nuclear power plants, he remarked that they have been operating since 1974, and account for 7.8 percent of the installed capacity in Argentina, with nearly 1,000 mw.

## INDIA

**Commentary Voices Serious Concern Over Kudangulam Reactor**90P40142A *Madras DINAMANI* in Tamil 8 Sep 90 p 4

[Editorial: "Let's Resist the Nuclear Reactor"]

[Text] Tamilnadu Chief Minister Mr. Karunanidhi has said "the Atomic Energy Commission Director, Dr. P.K. Iyengar, has informed me that there will be no danger in establishing a nuclear production facility at Kudangulam."

The chief minister opined that since this will only be a facility for generating electricity and not for producing a nuclear bomb, as was the case at Chernobyl, there was no chance for any similar disaster here. He did not mention any source for this information. As far as we know, the Chernobyl nuclear reactor was also built only for the generation of electricity. The Soviet Union has said that the explosion was caused by the faulty handling of machines by workers there. Even the adversaries of the Soviet Union have not accused it of producing nuclear bombs there. In addition, there is no guarantee that there will be no accidents in nuclear reactors used only for the production of nuclear power. The disaster that occurred in the Three Mile Island nuclear facility in the United States proved that.

Further, the approximately Rs. 8,000 crore Kudangulam nuclear facility will employ more than 5,000 people in only five or six years' time, according to the chief minister, Mr. Karunanidhi. He did not explain how it was justifiable to spend nearly Rs. 8,000 crores to employ 5,000, (i.e. Rs. 16 lakhs each!). It is not necessary to consult economic experts to realize that if this huge amount were to be used in encouraging small industries in villages, several lakh people would be employed!

It is only an illusion that the Kudangulam plan opens up employment opportunities for its residents. Perhaps in the beginning they may get small jobs laying roads and constructing buildings. After that, it will be only a few well-trained engineers who will find high positions in this huge nuclear facility which will be operated by computers. The truth is, these will be selected from all over the country.

It can not be accepted either that this facility is needed to fulfill the seriously inadequate power supply in Tamilnadu. The central government has not accepted to date the request by Mr. Karunanidhi that 75 percent of the electricity generated at Kudangulam should be given to Tamilnadu. It is even doubtful if it ever will!

Apart from this, the Tamilnadu government is also answerable to whether it is necessary to spend Rs. 8,000 crore and buy trouble, when there are less risky ways to fulfill the state's power requirements. It is still possible to construct several canals at Neyveli and generate electricity on a large scale. It is possible to transport natural

gas found in plentiful supply in Tamilnadu, Andhra, Maharashtra, and Gujarat via pipelines and generate power. Economic experts have pointed out that several crores worth of natural gas is just being burnt, constituting a significant national loss.

As soon as the DMK [Dravida Munnetra Kazhagam—Dravidian Progressive Foundation] came to power in Tamilnadu, the chief minister, Mr. Karunanidhi, had announced that a group of experts will be selected jointly by the central and the state governments to evaluate the Kudangulam proposal. He had assured that the plan would be implemented only after such a group certified the nuclear facilities as safe. There has been no news yet about any such expert committee or report. However, at Kudangulam, ground inspection and preliminary work have started! It is regrettable that the DMK government and Chief Minister Karunanidhi have broken promises in a matter so important to the people of Tamilnadu. The opposition has also not been questioning the government due to political reasons.

It is ignorant to argue that simply because the possibility of accidents exists, we should not hesitate to build nuclear reactors, or to talk of nuclear disasters on par with other accidents. The main difference between nuclear disasters and other types is that while others cause havoc at the time of happening, a nuclear disaster uproots human life and potential for several centuries thereafter. Several thousand people died in the Bhopal poison gas incident, and yet life returned to routine in time; in Chernobyl, however, there will be no human life for many generations to come.

It should also be noted that the Rs. 8,000 to 10,000 crore nuclear facility will be functional only for a period of 30 years. After that, it will become a problem as to what is to become of a nonoperational nuclear facility. It is not feasible to leave a nuclear reactor as is, since it will emanate tremendous radiation. If it were to be dismantled, storage of the contents would become a problem. Even if it were to be cemented and entombed, it is said that the radiation could still seep out and disrupt the normal life around.

The advanced nations are giving up on nuclear reactors because of considerations of these tremendous problems. There has not been a single reactor built in the United States since 1974. In Sweden, by the year 2010 every nuclear reactor will be shut off.

The Center and the state government in our country are not taking into consideration the risks involved, and the people of Kudangulam have no other option for their own and their progeny's protection but to take direct action. The people of Tamilnadu must support this Gandhian war of righteousness being fought by the collective peoples' force.

### Embassy in U.S. Denies India Imports Heavy Water

90WD0545A *Bombay THE TIMES OF INDIA*  
in English 2 Jul 90 p 9

[Text] Washington, Jul 1 (UNI): India has denied as "baseless" the allegation that it has engaged in clandestine import of heavy water from West Germany for its nuclear power plants.

Commenting on Gary Milhollin's article "Asia's nuclear nightmare—the German connection," appearing in The Washington Post of June 10, the Indian Embassy press counsellor, Mr. Dayakar Ratakonda, said "India is one of the few countries producing heavy water in substantial quantities."

"It has had six heavy water plants in operation for nearly a decade and two more are coming up," he added.

Mr. Ratakonda said Mr. Milhollin's subsequent conclusion that India was using its unsafeguarded nuclear power reactors to produce fissile material for a nuclear weapon arsenal was even more untenable.

The government of India had stated time and again at the highest level that it was against production and stockpiling of nuclear weapons and it remained committed to peaceful uses of nuclear energy, the spokesman said.

### General Doubts Reports on Pakistan Nuclear Arms

90WD0546A *New Delhi PATRIOT* in English 1 Jul 90  
p 1

[Text] Retiring Chief of Army Staff Gen. V.N. Sharma has raised doubts about the veracity of reports that Pakistan has acquired nuclear weapons.

In an interview to Doordarshan on the eve of his retirement from service he said that the Indian decision to go nuclear will depend on whether the reports we hear are valid and true, or whether they are just fake reports. However, he clarified that the only reply to a nuclear weapons capability of a potential hostile nation is to possess the same capability yourself.

"The desire of all our people and all soldiers is to avoid nuclear warfare under all circumstances, and I have no doubt that nations in the world who possess these weapons possess them solely to deter their use by their enemies rather than possess them actually to use them.

"So we take it if that is the line of which human endeavor is moving on this earth then we should try and prevent its utilization by international means and by diplomatic and political means and by other means.

"But as I said if you find that that does not work, there is no other answer except to possess these weapons yourself", Gen. Sharma said.

### Pakistan Attempt To Bilateralize Nuclear Treaty Alleged

90WD0547A *New Delhi PATRIOT* in English 10 Jul 90  
p 4

[Text] Pakistan Premier Benazir Bhutto wants to turn global questions like the nuclear non-proliferation treaty into bilateral issues while internationalizing bilateral issues like Kashmir. Islamabad has tried to involve the great powers and the Islamic countries in Kashmir. Pakistan Foreign Secretary Tanvir Ahmad Khan's recent statement that Islamabad is ready to discuss with India at the forthcoming foreign secretaries meeting the question of non-proliferation of nuclear weapons gives the impression as though the regional NPT would be on the Pakistan agenda. Only Pakistani leaders know how and in what way the question of the nuclear non-proliferation treaty becomes a bilateral question. Attempts to introduce contentious international issues in Indo-Pakistan bilateral talks have however on occasion been sought to be concealed by Islamabad's contrived formulation that the issue should be discussed on the basis of the UN resolutions. The conclusion is inescapable that Pakistan's two-pronged strategy has the objectives of camouflaging its nuclear weapons development programme on the one hand, and undermining efforts to resolve the issues bilaterally on the other. India has made its position amply clear that non-proliferation cannot be achieved in terms of geographic compartments, and this has nothing especially to do with Indo-Pakistan relations. Since the United States is very keen on getting India to accept the NPT, Pakistan wants to prove to Washington that it is pursuing an American foreign policy aim by including the NPT in the bilateral agenda of Indo-Pak talks. Islamabad wants to offer this sweetener to the United States to make its terrorism in the Kashmir Valley more palatable to the U.S. Administration. Pakistan is also seeking to capitalize on the perceived shift in Moscow's attitude towards nuclear non-proliferation. Several Soviet officials have, in recent months, spoken in favor of creating as many nuclear free zones as possible. India's position on this is unambiguous—the NPT in its present form is discriminatory; and in any event this is not a bilateral issue.

### Plans for Heavy Water Plants, Annual Production Noted

90WD0548A *Madras THE HINDU* in English 4 Jul 90  
p 4

[Text] Jaipur, July 3—The Atomic Energy Commission is planning to set up another heavy water plant at Kota in Rajasthan. This will be in addition to the one at Rawatbhata which produces only 40 tonnes of heavy water a year as against the annual plant capacity of 100 tonnes.

Plans are also on to set up a plant in South India which is expected to go into operation in two years and another in Uttar Pradesh.

The production circle of the Rajasthan State Electricity Board (RSEB) has been entrusted with the job of locating a suitable site for the plant to be installed in Kota.

According to informed sources, the Commission had initiated action in this regard last October. Subsequently the RSEB had proposed a location between Nayagaon village and a soyabean plant on Rawatbhata road near Kota.

**Details submitted:** Maps of the site plan and other relevant information had been furnished to the Commission. The proposed site was identified keeping in view the proximity of the Chambal river to ensure easy availability of water required by the plant.

However, the Commission is believed to be not in favor of the proposed site and has laid down some norms which stipulate among other things, that the location should not encompass any forest area and it should at least be 30 km away from the city. Efforts are now on to find another site.

**Low output:** The total annual capacity of the four heavy water plants in the country situated at Rawatbhata, Tuticorin Talcher and Baroda is around 280 tonnes. But their annual output is only about 150 tonnes.

A report estimates the country's heavy water need at 400 tonnes. About 250 tonnes is being imported from the Soviet Union at Rs 1,000 a kg.

But there is already a debate on the question of the feasibility and optimum utility of heavy water production. It is linked with the technology of waste disposal. Opinion is also veering round on the broad question of the huge quantity of water that is going waste and unused in our country which can be effectively harnessed for power generation.

#### Rumor of Nuclear Sub Purchase From USSR Denied

90WD0544A Bombay *THE TIMES OF INDIA*  
in English 14 Jul 90 p 1

[Text] New Delhi, July 13—An official spokesman clarified today that there was no proposal to buy or lease a second nuclear submarine from the Soviet Union.

The speculation in the Soviet media does not reflect the thinking of Soviet leaders. It was pointed out in the Soviet Union that there had been a lot of criticism about wasteful expenditure by the government and aid of various kinds being provided either free or on a low-interest rate.

The Soviet foreign minister and other officials have in interviews to *Pravda* said India's repayment of aid is punctilious. The criticism was against Soviet largess to other countries.

#### Reconstitution of Atomic Energy Board Reported 90WD0549A Bombay *THE TIMES OF INDIA* in English 24 Jun 90 p 5

[Text] Bombay, June 23—The atomic energy regulatory board has been reconstituted with Mr. S.D. Soman as its chairman.

The reconstituted board consists of Dr. R.D. Lele, medical director of Jaslok hospital, Dr. S.S. Ramaswamy, former director-general of the factory advice services and Labor Institute and Dr. A. Gopalkrishnan, director of the Central Mechanical Engineering Research Institute, Jamshedpur as its members.

The chairman of the safety review committee for operating plants (Mr. M.S.R. Sarma) is the ex-officio member of the board.

#### Official Discusses Dhruva Nuclear Reactor

BK1009065490 Delhi Doordarshan Television Network  
in English 1600 GMT 9 Sep 90

[Text] India's latest nuclear research reactor—Dhruva—has just completed five years of successful operation. One of the biggest in the world, Dhruva is expected to provide impetus to basic and applied research in the country. Our correspondent Shobha Raj Gopal reports:

[Begin recording] [Gopal] Dhruva is the first completely indigenous research reactor in our country. It is also one of the biggest research reactors in the world. This 100-megawatt reactor was built when the Atomic Energy Commission realized that to carry out certain experiments a higher nuclear-flux reactor was required. Dhruva uses natural uranium as fuel, and heavy water as a moderator and coolant. It has many new features not present in the earlier reactor.

[Unidentified official] Dhruva is very much refracted to... [changes thought] Because of its higher power, of course, it will produce more isotopes and because of its higher flux and the better way we now know how to do the optics of neutrons, we will be able to do much better experiments. The neutron beams that come out of it, the monochromatic beams that we produce out of this, are at least 10 to 20 times more than what we used to get with our earlier reactor.

[Gopal] A wide range of radio isotopes used in medicine, industry, and agriculture is produced by the reactor. Radio isotopes are those species of atoms which emit radiations from their nuclei. Dhruva has now become a national facility and is open to all research institutions in the country. [end recording]

**Atomic Research Center Develops Helium Source**  
90WD06624 Calcutta *THE STATESMAN* in English  
26 Jul 90 p 7

[Text] The Bhabha Atomic Research Centre is developing a few hot springs of West Bengal and Bihar into a reliable source of helium, an inert gas required in atomic power stations as well as for nuclear experiments. A plant of modest size has been in operation at Bakreswar for several years, separating the helium that emanates from the spring along with other gases. Its capacity will be increased and supporting equipment added so that it can also purify the gas collected at Tantlui, a spot in the forests of Bihar's Santhal Parganas district, about 26 km from Bakreswar. The Variable energy Cyclotron Centre, Salt Lake, is in charge of the project, which is likely to cost Rs 1.5 crores.

All the helium required in the country is being imported at present. Poland and Canada are the major sources, while a small quantity is available from the USA. However, such imports could not materialize at times. Washington had cut off supplies after the "implosion" of a nuclear device at Pokhran. Hence, the need for developing an indigenous source and for storing as much of the gas as possible. The USA is doing the same, according to VECC officials, whose immediate aim is to develop a supply sufficient for the "superconducting" cyclotron that has been sanctioned for Salt Lake in the Eights-Plan period. This machine will be critically dependent on a liquid helium-based cooling system, without which its magnet coils will cease to be "superconducting" and the cyclotron will fail to energize sub-atomic particles to anywhere near the desired level.

It was Professor Satyen Bose at whose behest the Bakreswar helium recovery project was taken up in 1972. Professor S.D. Chatterjee of the Indian Association for the Cultivation of Sciences played an important role in it. The project has remained confined there, although there are about 100 hot springs, many of which continuously spew the valuable gas, in a belt 2,500 km long and 500 km wide, stretching across Orissa, South Bihar, West Bengal and Assam. While the gases that come out of the Bakreswar springs are extremely rich in helium (the latter is about 1.8 per cent of the total), the yield of purified gas is not very high—about 65 litres a day. It has shown the same characteristics as 99.999 per cent pure helium imported from the USA. At Tantlui, the helium content of the hot spring gases is slightly lower, but the total yield has been estimated to be equivalent to 450 litres of purified gas per day. Hence, priority is being given to Tantlui, where facilities for collecting the hot spring gases will be set up in a year and a half. The gas will be transported to Bakreswar in cylinders for purification.

Farther afield, there are helium-emitting springs at Nunbil and Tantni in Santhal Pargana, Surjkund and Duari in Hazaribagh and Garampani in Assam's Golaghat district. These are not being developed at the moment. Their potential is not known to any great

degree of accuracy. Although the Golaghat gases contain far less helium than those elsewhere (only 0.4 per cent), the total volume of gas available there is very high. Incidentally, VECC officials say, even this gas is far richer in helium than anything available in the United States.

## IRAN

**China To Provide Atomic Reactor**

90AS0280D London *KEYHAN* in Persian 19 Jul 90 p 4

[Text] The Atomic Energy Organization of Iran seeks to buy atomic reactors from China. The desired reactor is a small version and the said organization intends to utilize it for research activities. The contract for the purchase of the said reactor was signed by the Nuclear Industry Organization of China and the Atomic Energy Organization of Iran about the end of June.

According to a report by the economic weekly MEED, published in London, the Atomic Energy Organization of Iran intends to install the purchased reactor from China in the Atomic Research Center in Esfahan. In a part of its report, the weekly MEED stated that there is no information about the technical characteristics of the reactor purchased from China.

The said publication added: "From 1979 the Atomic Energy Organization of Iran had placed the purchase of 30 megawatt reactor for research purposes at the top of its medium-range plans." MEED wrote: "In the mid-1960's the Tehran University purchased and installed a very small reactor for research purposes. This reactor is still used for experimental and training activities."

In another part of its report, the said publication wrote: "Before the revolution and formation of the Islamic Republic in Iran, the government had planned for the construction of at least 20 atomic power stations with the production capacity of 24,000 megawatts in various parts of the country by the middle of the 1990's. For this purpose, the German firm of Kraft Worche Union was tasked with the installation of two atomic reactors in Bushehr. Over 85 percent of the installation operations of these two reactors had been completed before the Islamic Revolution. [Also], the Atomic Energy Organization was preparing the preliminary work for the installation of two atomic reactors in Ahvaz with the participation of French [companies]."

The weekly MEED added: "After the Islamic Revolution, the Atomic Energy Organization of Iran canceled the scheduled program for the establishment of 20 atomic power stations. By the middle of the 1980's, this organization announced that it wished to complete the Bushehr atomic power plant installation operations. However, existing information indicates that the German company, Kraft Worche Union, has still not showed any willingness to proceed with this program.

Apparently, the issue of providing the expenses for the implementation of this program has been added to the present problems."

## ISRAEL

### Netanyahu Encourages U.S. on Antinuclear Campaign

TA0409133490 Jerusalem Domestic Service in Hebrew  
1300 GMT 4 Sep 90

[Excerpt] Deputy Foreign Minister Binyamin Netanyahu has said that after the Gulf crisis is over, an international effort will be needed to stop the distribution of nuclear weapons to tyrannical regimes, and suggested that the United States head this campaign. Deputy Minister Netanyahu spoke to U.S. Senator Alan Cranston, who arrived in Israel after visiting U.S. troops in the Gulf. [passage omitted]

### Defense Source Confirms Agreement on Patriot

TA0609063290 Tel Aviv IDF Radio in Hebrew  
0600 GMT 6 Sep 90

[Text] There has been official approval in Israel that an agreement to lease the Patriot missiles has been signed: A senior source at the defense establishment has said that while in Washington, Defense Ministry Director General David 'Ivri signed an agreement that the United States would lease to Israel several Patriot missile batteries. Today the Patriot is the only missile capable of operating against surface-to-surface missiles. The senior source added that all other reports about the supply of additional U.S. weapons to Israel are not true.

## PAKISTAN

### Scientist Speaks on Kahuta Nuclear Plant

BK1009135790 Islamabad THE PAKISTAN TIMES  
in English 10 Sep 90 p 6

[Text] Lahore, Sept. 9—Dr. Abdul Qadeer Khan, eminent nuclear scientist, said here Sunday that the Kahuta Plant had put Pakistan on the world nuclear map and laid its solid foundation for self-sufficiency in the peaceful use of nuclear energy.

Speaking on "Pakistan's Nuclear Programme", at a ceremony held to award him a gold medal by the Pakistan Institute of National Affairs (PIN), he said that enriched uranium being produced at Kabuta would be used as fuel in future nuclear power reactors and save the country hundred of millions of dollars.

He said the use of two atomic bombs by the USA against Japan laid the foundation for a mad nuclear arm race which was still going on. The Russians, genuinely suspicious of the American intentions, went all out to have their own atomic and hydrogen bombs. This was followed by UK, France and China.

He said that concerted efforts by the Third World countries supported by some Western states like Sweden; Ireland, Netherland, Switzerland led to a consensus on the urgent need of an international agreement to stop the spread of nuclear weapons. This resulted in the establishment of Nuclear Non-Proliferation Treaty [NPT] in 1970. About 130 countries had so far signed the NPT despite its highly discriminatory nature, as it allowed the nuclear weapon power to accumulate and enhance their stockpile of nuclear weapons putting severe restriction on even the peaceful utilisation of nuclear powers by the have-nots.

Dr. Qadeer said that China had serious security problems from both the USA and the USSR and had no alternative, but to go nuclear to safeguard her integrity and independence. Things had settled down and there was a status quo in this matter when on May 18, 1974 India shattered this delicate balance by exploding a nuclear bomb in Rajasthan.

At this stage, Pakistan decided to go alone and self-reliant in nuclear technology and the then government in July 1976 decided to go all out to master the enrichment technologies. The Engineering Research Laboratories were established on July 31, 1976 to undertake the task of putting up an indigenous enrichment plant. Mr. Ghulam Ishaq Khan was appointed as the Chairman of the Coordination Board.

He said a country which could not make sewing needles or even ordinary durable mettled road was embarking on one of the latest technologies. Only seven countries in the world possessed this technology. Of the whole nuclear cycle, enrichment was considered to be the most difficult and sophisticated technology which was a real challenge to us.

He said that his long stay in Europe and intimate knowledge of various countries and their manufacturing firms was an asset. Within two years we had put up working prototype of centrifuges and were going at full speed.

He said that tremendous pressure was brought on us and our economic aid was cut off by the USA. An embargo was also put on such small things as rubber rings, magnets and maraging steel tubes. These problems were faced boldly and we increased our efforts to finish the job as quickly as possible. The Western Press, he said, mounted an unfounded propaganda against the programme and a case was initiated against him in Netherlands for writing two letters to two of his former colleagues. The letters were interpreted as an attempt to obtain information which the public prosecutor interpreted as classified.

He said that an enrichment plant needed a lot of precautions of failsafe systems. Once the Western propaganda reached its climax and all efforts were made to stop or block even the most harmless items, we started indigenous production of all the sophisticated and electrical vacuum equipment.

He said "Kabuta is an all Pakistani effort and is a symbol of Pakistan's determination to refuse to submit to blackmail and bullying. It is not only a great source of personal satisfaction to me but is also a symbol of pride for my colleagues."

The scientific community of Pakistan, he said, was genuinely concerned over the performance of the Pakistan Atomic Energy commission [PAEC]. The Commission promised to fabricate indigenous reactors fixing a target of eight reactor by 1990 and 16 more by 2,000, for the production of 1,000 megawatts and 2,400 megawatts of nuclear energy respectively. But apart from the turnkey project of KANUPP [Kahuta Nuclear Power Plant] not a single kilowatt of additional nuclear energy had so far been added to the national grid.

Dr. Qadeer said that PAEC should realise its accountability to the nation and discharge its responsibility with scientific acumen and a spirit of patriotism. Failures in scientific experimentation should make us wiser rather than obstinate.

The nuclear scientist said that the Pakistan enrichment experience had demonstrated that if a nation was sincere and determined to achieve a certain goal, she would do it and would do it so much sooner than anticipated. He said what we achieved in five years at a much lower cost was considered by others unattainable in 50 years. If goal-oriented and sincere effort had been made by the PAEC, they could definitely result in her own reactor in the coming years. "It is still not too late and Pakistan can again show that it can meet any challenge when it comes down to national pride and honour."

Earlier, Dr. Ejazul Hassan Qureshi decorated Dr. Abdul Qadeer Khan with the "Man of the Nation Award" on behalf of Pakistan Institute of National Affairs in recognition of his services in the Field of Nuclear Field [as published]. Welcoming Dr. Qadeer and the guests, Dr. Altaf Hussain Qureshi, Secretary-General, PINA said that the nation felt pride in being led by a person like Dr. Abdul Qadeer Khan in the field of Science and Technology.

**Nuclear Waste Blamed as Cause of Volga Quake**  
**PM2808144190 Moscow IZVESTIYA (morning edition)**  
**in Russian 18 Aug 90 p 6**

[Article by M. Piskunov, ULYANOVSKAYA PRAVDA oblast newspaper correspondent, including editorial commentary under the rubric "Committed Reporting; Tracks Lead to Testing Ground?"]

[Excerpts] Inhabitants of Dimitrovgrad in Ulyanovsk Oblast have been alarmed by unusual earthquakes—an unusual phenomenon for the Middle Volga. The city was shaken strongly by underground tremors in the middle of summer. In the absence of a reply from the authorities and specialists, the journalist tried to conduct his own investigation. [passage omitted]

Immediately after the first underground shock, the city's civil defense headquarters gave a report via the local newspapers. It ran as follows: The appropriate city services have carried out reconnaissance of the area, but no external factor capable of causing a tremor has been detected. The reason for its taking place is unknown....

The gorispolkom [city soviet executive committee], it seems, was not too concerned with investigating the unusual phenomenon. Neither have representatives from industry or the nuclear power industry made an official statement.

What have nuclear power specialists got to do with this? The point is that, in searching for the reasons for the Dimitrovgrad earthquakes, I unexpectedly managed to get out to the Scientific Research Institute for Nuclear Reactors, or more precisely to its testing ground for burying radioactive liquid waste which is located right in the area where the underground elemental manifestation occurred. At one time the USSR Ministry of Geology was involved in creating the testing ground. The Scientific Research Institute for Nuclear Reactors' actual "boss" is the Ministry of the Nuclear Power Generation and the Nuclear Industry. Until recently the testing ground operated under the "secret" stamp. Last year the veil was finally lifted.

Leaders of the Scientific Research Institute for Nuclear Reactors claim that all is quiet at their testing ground and they consider the liquid waste deep burial method itself ecologically safe both to the environment and people's health. [passage omitted]

And what is the composition of the solutions being pumped at the testing ground? It transpires that liquid waste from all the facilities of the Scientific Research Institute for Nuclear Reactors' industrial site converges here as if in a slop bucket. In this way not only a large quantity of water is forced into geological formations, but also all kinds of chemicals including radioactive substances together with it. So just what is going on down there in the depths of the earth? What processes or chemical reactions could occur? There are, alas, no precise answers to these questions.

The following question probably occurs to readers: How do they handle liquid radioactive waste at the country's other nuclear facilities? The majority of AES's [nuclear electric power stations] do not use the method of pumping them into deep earth strata. They use completely different methods, including evaporation.

But let us return to the Dimitrovgrad testing ground. Familiarizing myself with the literature on the immediate problem, I studied the book "Contemporary Problems of Nuclear Science and Technology in the USSR" ["Sovremennyye Problemy Atomnoy Nauki i Tekhniki v SSSR"] published in 1976. The work's author, A. Petrosyants, who at that time occupied the post of chairman of the State Committee for Utilization of Atomic Energy in the USSR, was convinced of the economic advantages of the deep underground burial of radioactive liquid waste, and cited as an example the very same Scientific Research Institute for Nuclear Reactors testing ground. But lo and behold, comparing his information on the lithological structure of the burial zone with a document, I discovered, to put it mildly, a geological section of the well with contradictions giving rise to grave fears concerning for instance the waste burial depth.

So is it permissible to continue the practice of deep burials of radioactive liquid waste as is done in Dimitrovgrad? It would be nice to believe that an appropriate ban will follow. But this threat of calamity will remain. If karstic processes now leak through to the depths under the testing ground, or some sort of chemical reaction occurs, what guarantee is there that they will stop in the next few years...? That the worst will not happen?

Alarm is heightened by the fact that burial grounds for highly radioactive solid waste are located literally next to the testing ground and the nuclear reactor buildings are just a little further on. And there are eight of them in Dimitrovgrad, including seven in operation!

I would be glad if the version given here of the reason for the Dimitrovgrad local earthquakes is not confirmed. Be that as it may, in the light of the facts disclosed, the testing ground's fate must be decided urgently.

**From the Editor**

[passage omitted] Prior to publication we showed the report to specialists.

This is how A. Rybalchenko, research laboratory chief at the VNIIPiPromtekhnologiy [expansion unknown], and D. Levitskiy, a leading engineer at the institute, interpret the situation: "First of all, underground tremors in Dimitrovgrad measuring up to Force 5 make it necessary in any case for a special interdepartmental commission to study the reasons for these phenomena. But currently there are no objective data enabling these phenomena to be linked to the burial of the Scientific Research Institute for Nuclear Reactors' industrial effluent. Research conducted since 1966 at the industrial effluent burial testing ground likewise does not permit such a conclusion to be

made. For a thorough evaluation of the possible reasons for the occurrence of seismic activity, it is necessary to analyze data on natural earthquakes occurring in the last 10 to 15 years in neighboring regions—the Tatar ASSR [Autonomous Soviet Socialist Republic], Kuybyshev Oblast, and others.... It is necessary to examine in detail the data from observations of the status of absorption levels [pogloshchayushchiye gorizonty] actually at the testing ground which did not show marked anomalies during the period of the earthquakes. The effect of filling up the Kuybyshev reservoir on the geostatic equilibrium must also not be excluded from consideration.

"We consider it necessary to set up a seismic station in this rayon and involve in this work the USSR Academy of Sciences Institute of Earth Physics which has experience of conducting research at similar facilities."

...One thing is clear: Letting the "earthquakes" in this city go undetected is criminal. The editor hopes to return to the problem raised in the report after thorough research of this testing ground's current condition by specialists.

### Third World Arms Transfers 'Inspire Fear'

PM0509091590 Moscow KOMSOMOLSKAYA PRAVDA in Russian 4 Sep 90 p 3

[Article by D. Yevstafyev: "Russian Roulette in the Atomic Age; Are We Not Doing Ourselves a Disservice by Giving Military Aid to Developing Countries?"]

[Text] The situation which has taken shape in the Persian Gulf has demonstrated to us that Third World countries are beginning to play an increasingly independent role in world politics. On the one hand this is good, while on the other we must bear in mind that it is by no means Iraq alone that cherishes hegemonist ends.

The new thinking has done what seemed impossible only recently. We have at last stopped looking at the United States through the notch on a rear sight, and our relations have acquired a civilized nature. You might think it is possible to breathe more easily. But no, it is not. As the events of the past two years have shown, the threat to the superpowers stems not only from each other's nuclear arsenals. One of the new and not yet fully understood sources of danger lies in the Third World. What is this threat? Without laying claim to an exhaustive characterization, I will attempt to outline some of its features.

The very fact that arsenals of arms which would be the envy of NATO and the Warsaw Pact have been created in many Third World countries must inspire fear. But this is still not everything. Whereas previously the threat proceeding from developing countries was mitigated by the fact that it could only be a threat to the superpowers' interests and not to the superpowers themselves, now, in connection with the spread of missile technology, European states cannot feel safe. A considerable part of the territory of the southern Soviet Union is within the range

of missiles like the Jericho (Israel) and the CSS2 (made in China and now in Saudi Arabia's arsenal).

Another special feature of the situation is that the regional arms race is stimulated by local conflicts in the Third World. At the same time, whereas in Soviet-U.S. relations nuclear and missile weapons were designed chiefly for restraint and deterrence—in short, for indirect use—in the Third World they are patently created for direct use.

How has it happened that weapons capable of threatening not just the interests but also the security of leading states have ended up in the hands of Third World countries?

Until recently people mainly looked on the situation in the Third World through the prism of the Soviet-U.S. confrontation. There were periods when it was deemed possible to pursue a policy of detente between our two countries while a most intransigent encounter was under way on a regional level. There were purely financial reasons for this in addition to political ones, since the Third World was a major market for arms sales. Unfortunately, weapons deliveries were for the USSR the chief means of penetrating developing countries. The search for "allies" throughout the world resulted in the Soviet Union being drawn indirectly (and, in a number of cases, directly too) into many conflict situations. It was to justify that policy that the concept of giving aid to "national liberation movements" and "anti-imperialist states" was invented. The splendid stucco moldings of ideological exclamations concealed a traditional globalist approach which was not commensurate with the financial, economic, and political possibilities. The partners became accustomed to the fact that they frequently did not have to pay for aid from Moscow, which contributed still further to the drop in our prestige. In fact, cooperation with many Third World countries has in recent years led to results directly opposite to those intended.

How is the situation in the Third World characterized now from the military-political viewpoint?

One of the most dangerous phenomena is the spread of chemical, missile, and potentially also nuclear weapons. For a long time it was thought that the developing countries' scientific and industrial potential would not enable them to create arsenals of this kind themselves. But that proved a mistake.

As for nuclear weapons, the first alarm bell rang the moment India tested a nuclear charge, which was subsequently called "peaceful." Naturally, the emergence of such a weapon in India could not go unnoticed, and Pakistan announced that the creation of deterrent weapons was a priority in its national security policy. Israel has probably become another Third World nuclear power—which it neither confirms nor denies.

But this is not all. If we speak of countries which international experts suspect of violating the nuclear

nonproliferation regime, the list is quite long. There is Libya, Iraq, Iran, the DPRK, Taiwan, Argentina, and Brazil. How did these states acquire the raw materials and technology? Here we can say that developed countries—probably because they did not take seriously the possibility of the "nuclear club's" expansion—did not fulfill too carefully the terms of the Nuclear Nonproliferation Treaty. Still fresh in our memory are scenes on the "Vremya" program showing our country's successes in cooperation with "traditional" partners in harnessing the "peaceful atom." And the USSR was not alone in its delusions concerning the intentions of Third World countries. Individual components of nuclear technology were handed over by France, the FRG, Britain, and the United States.

Chemical weapons too are not a rarity in developing countries. The simplicity of production enables even the most backward states to acquire arsenals of these "nuclear weapons for the poor," as they are called. Here too technology has been handed over. It was evidently thought that developing countries are incapable of producing sophisticated chemical weapons. Yes, this is so. But they do not need them. Hydrocyanic acid, mustard gas, and other substances that have come down from the times of World War I would be perfectly adequate. However, there is a tendency to create new models of chemical weapons. Iraq, for example, has announced that it has binary ammunition.

According to the most modest estimates, the arsenals of more than 10 countries contain chemical weapons. Let us name as examples Libya, Iraq, Iran, Israel, Egypt, and Vietnam. While fighting each other Iraq and Iran actually employed chemical charges. Only the targets of gas attacks were not military subunits but the civilian population. Some sources maintain that Libya also used such weapons in the war against Habre's forces in Chad.

In the Third World at present India, Pakistan, Iraq, Iran, Egypt, Israel, Vietnam, Syria, Libya, Yemen, Algeria, both Koreas, Taiwan, and Saudi Arabia undoubtedly possess missiles. At the same time the arsenals of Iraq, India, Pakistan, and Egypt contain systems that may be classified as missiles with an operational-tactical range; and Israel, India, and Saudi Arabia possess intermediate-range systems.

Many countries have begun the flow-line production of their own missile technology. This means not only the strengthening of the potentials of the arms manufacturers themselves but also an increase in the sources from which it is possible, given the desire, to obtain such weapons.

Exports and reexports of weapons within a region are also becoming increasingly significant. Not just independently produced weapons but also those obtained from outside.

And here a considerable share of the responsibility lies with the developed countries. I am not inclined to pin the blame entirely on the Soviet Union alone, for in the

past the United States got itself into a difficult situation when Iran was transformed from an ally into an enemy and the weapons supplied to it ceased to be a means of defending U.S. interests and began posing a threat to them. In the past we had an equally instructive experience in Egypt. From all this conclusions should have been drawn with regard to the fact that in the entire spectrum of interstate contacts ties along military lines are, as a rule, the most flimsy.

What is to be done? I am afraid that at present neither we, nor the Americans, nor other countries are ready to answer this question. The nature and character of the threat posed by the situation in Third World countries is so multifaceted that it will take a long time for effective neutralizing mechanisms to be created. But we must draw some conclusions right now.

First, the military must reconsider its whole approach to this problem. The trouble is that our defense policy was mainly geared to the hypothetical threat from the West, which could be realized only under very specific conditions. The threat from the East and the South is not hypothetical but very, very real. The events in the Persian Gulf have demonstrated that escalation can happen almost instantaneously. What is needed to counter it is an army capable of operating in any region. Incidentally, the Americans had already prepared to combat a threat to their national security from the south. The concept of "low-intensity conflicts" was officially made public back in 1986. Nicknamed "interventionist"—for which there were certain grounds—it is at least some means of containing regional threats, albeit by manifestly dubious methods.

#### Shevardnadze Cables UN Chief on Arms Sales

LD1408161790 Moscow TASS in English 1558 GMT  
14 Aug 90

[Text] Moscow August 14 TASS—The Soviet Union has called for the restriction of international sales and supplies of conventional weapons, says a letter by Soviet Foreign Minister Eduard Shevardnadze to U.N. Secretary General Javier Perez de Cuellar, published here today.

The letter points to the need to put this problem on the United Nations agenda and notes that arms supplies often "run counter to the present positive development of the international situation."

Shevardnadze confirmed Soviet readiness for a dialogue on the restriction of sales and supplies of conventional weapons with the United States and other suppliers, as well as with recipient countries and regional organizations.

He expressed conviction that "the prestige of the United Nations should be involved in settling these issues."

Shevardnadze believes it is necessary to apply the principle of transition from superarmament to reasonable

sufficiency for defence to the problem of restriction of international sales and supplies of conventional weapons.

He also calls for limiting the proliferation of the most destructive and destabilising weapons.

In his opinion, it is important to establish an efficient multilateral regime of nonproliferation of some types of missiles and missile technology.

Stressing the importance of openness in this sphere, Shevardnadze called for the legislatures of U.N. member states to debate arms sales and purchases. He said that the Soviet leadership intended to draft and submit an appropriate law for the consideration of the Soviet parliament.

Shevardnadze supported establishing a register of arms sales and supplies at the United Nations, expressing Soviet readiness to participate.

He said that the restriction of sales based on mutuality or the imposition of a moratorium should be a part of any package of commitments on a political settlement of world conflicts.

Dealing with the struggle against illegal arms trafficking, Shevardnadze pointed to a possibility of establishing (as is the case with illegal narcotics trafficking) cooperation between customs and law enforcement services of states.

In Shevardnadze's opinion, the implementation of measures to achieve openness and limit the arms trade "would open prospects for drafting a convention, under U.N. auspices, to restrict international arms sales and supplies."

### Concern on International Arms Trade Viewed

LD1608184490 Moscow TASS in English 1804 GMT  
16 Aug 90

[By TASS military analyst Vladimir Chernyshev]

[Text] Moscow August 16 TASS—The flourishing international arms trade causes widespread concern in the world, and rightly so.

The situation is aggravated by the fact that conventional weapons have become as potent as tactical nuclear arms. Missiles, including ballistic, are spreading all over the Third World.

Approaches to military aid and arms sales needs additional consideration on the basis of new political thinking. This is exactly what the Soviet Union has been calling on the international community to do.

A letter sent by Soviet Foreign Minister Eduard Shevardnadze to the United Nations secretary general contains concrete proposals to put limits on international arms deliveries and sales on the United Nations agenda.

What solutions does the Soviet Union propose for this complex problem? First of all it would be expedient to replace excessive arms stockpiling with the principle of reasonable defence sufficiency, which would exclude the possibility of accumulating offensive potentials.

It is necessary to stop the proliferation of the most destructive and destabilising weapons.

It is also necessary to create an effective multilateral regime for the nonproliferation of some types of missiles and missile technologies.

It would be wise to ban deliveries of weapons banned under a convention on nonselective conventional weapons or weapons causing excessive destruction.

Also, agreements to reduce arms in one part of the world should not unleash military rivalry in other regions.

The Soviet Union supports greater openness in the international arms trade. Admittedly, the Soviet Union has itself been secretive in the past on this issue.

The Soviet Ministry for Foreign Economic Relations and the Defence Ministry were in total control of the arms trade. The Soviet Union now plans to prepare and submit to parliament a corresponding bill.

The search for a general consensus in the arms trade has not yet entered the negotiating stage. However, the Soviet Union is convinced that states can jointly find a constructive solution to the problem of limits on conventional arms deliveries and trade, thus enhancing international stability and peace.

### Military Analyst on Missile Technology Proliferation

LD2008170190 Moscow TASS in English 1633 GMT  
20 Aug 90

[“TASS Comment” by military analyst Vladimir Chernyshev: “Rocket Technology Is Spreading”]

[Text] Moscow August 20 TASS—Iraq's invasion of Kuwait, together with many political and military issues, again put the problem of rocketry proliferation before the international community.

Access to weapons of various modifications creates a chance for spreading the arms race to various areas of the world and raises a possibility of unleashing destructive and bloody regional conflicts.

According to the International Institute for Strategic Studies in London, over 20 developing countries have missiles capable of hitting targets in other countries. Both Western countries and the Soviet Union actively contribute to spreading rocket technology.

Here is an example of the Middle East. Israel has mobile ground-to-ground missile systems purchased from the United States or developed with the use of French technology.

Arab countries, including Iraq, Syria, Saudi Arabia, are working on missile weapons or purchasing them abroad. Iraq is a "front runner" in this field. It has experience of using missiles during the armed conflict with Iran.

Baghdad which bought missiles in the USSR improved them with the assistance of specialists from West Germany, Argentina and other countries. Taking into account present missile stockpiles, crises, similar to the present one in the Gulf, are unpredictable.

In a letter to the U.N. secretary general, Eduard Shevardnadze made timely proposals to limit arms sales and to put obstacles in the way of missile technology proliferation. The following items are the most important in the new Soviet package.

Firstly, a call for openness in arms trade. The Soviet Union proposes that data on the deliveries of offensive weapons, including combat missiles and missile systems, should be forwarded to the United Nations.

Secondly, the spread of openness to various spheres, including aid in the organisation of arms production, construction of military projects and training of military personnel.

And, finally, understanding about specific limitation procedures on all the above issues in their application to areas of conflicts.

The practical implementation of the above proposals would create such a situation, in which the limitation of deliveries of missile weapons and technology or the imposition of a moratorium on them could become a component part of any package of commitments of interested countries on a political settlement of regional conflicts.

Talks on export and import of missiles and technology should also take into account the rights of states to individual and collective defence.

However, the principle of reasonable defensive sufficiency and the prevention of a chance to create offensive potentials, dangerous for some or other regions of the world, should play the decisive role.

#### Petrovskiy Praises Non-Proliferation Treaty

LD2108132790 Moscow TASS in English 1242 GMT  
21 Aug 90

[By TASS correspondent Boris Shabayev]

[Text] Geneva August 21 TASS—A Soviet deputy foreign minister has described the Nuclear Non-Proliferation Treaty as a "major and authoritative multilateral document, which by right is considered as the basis for security and stability in the rapidly changing world."

Vladimir Petrovskiy is heading the Soviet delegation to the fourth conference discussing the treaty's implementation, under way here.

He told the conference that the nonproliferation regime was acquiring "special importance now that the process of eliminating nuclear arms stocks has begun".

"The breakthrough in this field, achieved by the Soviet-U.S. Intermediate-Range Nuclear Force Treaty, a planned treaty on cuts in strategic offensive armaments, and the opening of real prospects for radical reductions in tactical nuclear weapons in Europe are creating a favourable situation for strengthening the nonproliferation regime, proclaimed in the 1968 treaty," Petrovskiy said.

#### Petrovskiy Cited on Non-Proliferation Review

PM2208093790 Moscow IZVESTIYA (morning edition)  
in Russian 21 Aug 90 p 1

[Article by special correspondent Yu. Kovalenko, incorporating interview with Deputy Foreign Minister V.F. Petrovskiy, head of the Soviet delegation at the Geneva nonproliferation review conference: "Geneva: Discussion on Non-Proliferation of Nuclear Weapons"]

[Text] An international conference examining the operation of the Treaty on the Non-Proliferation of Nuclear Weapons, which came into force in 1970, has opened at Geneva's Palais des Nations. Delegates from around 140 countries are taking part in its work. Representatives of China, France, Israel, South Africa, and a number of other states which are not signatories to this agreement have come to such a meeting for the first time as observers.

The conference will sum up the results of the operation of the Treaty on the Non-Proliferation of Nuclear Weapons over the last five years. It will also make a preliminary examination of questions concerning the future of the treaty, which expires in 1995. The achievement of an accord either prolonging it or making it of unlimited duration is therefore essential.

"This treaty," USSR Deputy Foreign Minister V.F. Petrovskiy, head of the Soviet delegation at the Geneva conference, stated in conversation with your conversation, "is a major multilateral agreement limiting nuclear weapons spatially in a 'horizontal direction,' so to speak. We consider the international system of nonproliferation formed on its foundation as a very important factor in world security and stability."

At the present conference—the fourth to date—the minister went on to observe, is taking place for the first time in conditions where real movement toward nuclear disarmament has gotten under way. The task now is to ensure that, on the one hand, the reduction of stockpiles continues, proceeding "vertically," while, on the other, ensuring that the treaty is made universal in nature.

Today, three of the five nuclear powers—the Soviet Union, the United States, and Britain—are party to the treaty, while the other two—China and France—have

not subscribed to it. The so-called "near-nuclear" countries—South Africa, Israel, India, Pakistan, Brazil, Argentina, and a number of other countries—still remain outside the treaty framework.

Summing up the results of the treaty's 20-year-long operation, the Soviet deputy foreign minister particularly stressed that the treaty has met its objectives. The number of nuclear states has remained unchanged, whereas certain politicians predicted that it would increase several times over.

Another important feature, in V.F. Petrovskiy's opinion, is that the treaty in many respects heralded an approach to the world's problems based on international law. And in the past, during the most tense moments in the history of Soviet-American relations, it remained a thread connecting the two countries and served as a mechanism for consultations between Washington and Moscow.

The agreement, the deputy minister pointed out, is the cornerstone of the nonproliferation system. However, it has been substantially augmented by regional treaties setting up nuclear-free zones in Latin America and the southern Pacific and also—de facto—in the Antarctic and outer space. The Soviet Union supports initiatives to form nuclear-free zones in individual regions of Europe, the Mediterranean, the Near East, Africa, and Southeast Asia and advocates nuclear-free status for the Baltic Sea.

The activity of the International Atomic Energy Agency [IAEA] serves as an essential component in maintaining and strengthening the nonproliferation regime, stressed V.F. Petrovskiy.

An optimistic approach prevailed during the preparation of the Geneva forum and it seemed that the conference was "bound to succeed." However, the recent events in the Persian Gulf zone could have the most direct influence on its results. Iraq's aggression against Kuwait will considerably complicate the conference's task—this is the conclusion just reached by a group of experts brought together by the American Arms Control Association.

Pessimistic notes are now being heard increasingly clear. Thus, for example, Leonard Spector of the Carnegie Endowment, a well-known specialist on questions of nuclear weapons nonproliferation, has in many respects dashed hopes for the meeting's success. He assumes that Iraq will raise the question of Kuwait's representation at the conference and thereby provoke sharp argument. Finally, Baghdad could state its intention to withdraw from the treaty. Such a step would further aggravate the international community's concern over Iraq's plans to possess nuclear weapons (given that it recently tried to acquire the necessary materials). However, Spector thinks that Baghdad needs another 10 years to set up their production.

There are other problems too which could hamper the participants at the Geneva forum in reaching consensus. Ben Sanders, general secretary at the previous treaty

review conference (1985), cited Pyongyang's nuclear program as one of them. Serious misgivings were also voiced on this score by other figures. Although the DPRK signed the nonproliferation treaty five years ago, it refuses to authorize IAEA representatives to inspect facilities where nuclear research is carried out. And this is in breach of the agreement.

By all appearances, debates are going to develop on the participation in the conference as observers of representatives of Israel, the state of Palestine, and South Africa. All the indications are that Pretoria, which specialists consider capable of producing nuclear weapons in small quantities, will sign the treaty shortly.

The whole range of questions connected with nuclear weapons will be touched on—to some degree or another—at the Geneva conference. Many politicians in the West describe our program of achieving a nuclear-free world as "unrealistic" and "utopian" and regard it, to put it in our own terms, as "manilovshchina" [after Manilov, daydreaming, feckless character in Gogol's "Dead Souls"]. Nuclear weapons, they never cease repeating on the banks of the Seine, serve as a deterrent to a potential aggressor. It seems that no one objects to the most radical cuts in nuclear weapons arsenals, but that in the process Paris and London do not intend to give up their "bomb" in the visible future.

So far as the Soviet Union is concerned, V.F. Petrovskiy said, it remains true to the ideal of a nuclear-free world and advocates the gradual overcoming of the "doctrine of nuclear deterrence." However, we do appreciate, he observed, that it will not be possible to do away with nuclear weapons immediately. Therefore the question of achieving an accord on minimal deterrence arises at the present time. How should it be expressed in numerical terms? It is difficult to answer that. Some specialists propose retaining 5 percent of the current Soviet and American nuclear stocks, which, it seems, will roughly correspond to the present-day level of French nuclear forces.

One of the Soviet Union's main aims, V.F. Petrovskiy recalls, remains the speediest banning of nuclear tests. Not so long ago, over a period of 18 months from August 1985 through February 1987, Moscow observed a unilateral moratorium. And again, since November 1989, our nuclear ranges have been inactive. The United States has also cut back on its nuclear tests.

Washington and Paris stress that such tests are essential to them for monitoring the effectiveness of stocks and their combat readiness, as well as for improving the technology. Therefore the West turns down all our relevant initiatives. In such conditions, V.F. Petrovskiy admits, the solution of the problem of banning nuclear tests is scarcely possible at the moment. But progress in the sphere of limiting the yield of nuclear explosions and reducing their number is completely realistic.

**Position on Nuclear Nonproliferation Reviewed**

LD2208162190 Moscow TASS in English 1515 GMT  
22 Aug 90

[By TASS political news analyst Albert Balebanov]

[Text] Moscow August 22 TASS—The speech of Soviet Deputy Foreign Minister Vladimir Petrovskiy at a conference in Geneva discussing the implementation of the Nuclear Non-Proliferation Treaty became one of the main sensations at the forum. On behalf of the Soviet Union he stated that Moscow was unilaterally expanding the list of Soviet nuclear facilities that from now on will be open to control of the International Atomic Energy Agency (IAEA).

Under the treaty, neither the Soviet Union nor other nuclear powers are obliged to open their nuclear reactors to IAEA control.

This gave nonnuclear countries reason to assert that the treaty is unfair and that the control of IAEA is for them a costly burden which nuclear powers avoid.

To counter these accusations, nuclear countries stated that they were ready to open part of their nuclear activity to IAEA control.

Negotiations on guarantees were held with IAEA. Upon their conclusion the Soviet Union signed in 1985 an agreement with the organisation giving it the right to control a number of civil nuclear power plants. The three other nuclear powers acted in the same way.

These actions show that control is not an obstacle to normal peaceful commercial activities in nuclear power. Quite the contrary, it strengthens confidence among countries. In addition, actions of nuclear powers gave the IAEA the opportunity to accumulate the experience of control at new nuclear plants.

Initially the Soviet Union placed under IAEA control 31 power plants and research reactors in 1985. They included not only operating reactors but also reactors that were being built for a number of nuclear power plants. The third power generating set of the Beloyarsk nuclear power station—a fast-neutron reactor, and the storage for spent fuel at the Novovoronezhsk nuclear power stations were added to this list in 1987.

The Soviet Union's latest step in the area of nuclear nonproliferation control, announced by Vladimir Petrovskiy in Geneva, will be implemented in the form of an official document of the USSR. It will be referred to IAEA leaders in mid-September at the general conference of that organisation.

TASS learned at the USSR Ministry of Energy and Industry that the decision applies to power-generating reactors that are not under IAEA controls at present. These are, specifically, reactors at the Kola, Rovno, Ignalina, Khmelnitsky and other nuclear power stations, as well as an additional number of research reactors situated in Moscow.

This list does not mean that all these reactors will be under control: IAEA has a right to choose reactors to control. This is

of importance, as control is very expensive. It is paid for from the IAEA budget, but it should not be forgotten that this budget is formed by contributions of member-countries.

One-third of the organisation's budget is spent on control for nuclear reactors. But if the IAEA were to overlook the operation of all the existing reactors, it would be necessary to increase its budget at least four-fold.

It is hoped in the Soviet Union that this initiative, which is a manifestation of goodwill will not lead to the growth of IAEA expenditures in nuclear countries, and that it will be assessed as a striving to enhance the prestige of this organisation and show greater attention to measures for the nonproliferation of nuclear weapons.

**Gorbachev Greets IAEA Treaty Conference**

PM2308120590 Moscow IZVESTIYA (morning edition)  
in Russian 22 Aug 90 p 1

[“Text” of message from M. Gorbachev: “To Participants in Conference To Examine the Operation of the Nuclear Non-Proliferation Treaty”]

[Text] I greet the participants in your extraordinarily important conference.

During the years of the treaty's operation it has become an essential part of the legal foundation of international relations.

Under the conditions of the real nuclear disarmament which has begun, the nonproliferation of nuclear weapons acquires special importance. The observance of the treaty is becoming one factor of the successful continuation of that process.

I want to state most clearly that the consolidation of the 1968 treaty and the attainment of its universality remain the unvarying goal of Soviet foreign policy. The Soviet Union advocates the reliable safety of nonnuclear countries from the use or the threatened use of nuclear weapons. Our aim is to ban and completely eliminate nuclear weapons under effective international control and to build a nuclear-free world. The Soviet Union will continue to seek persistently results for talks on all aspects of nuclear disarmament.

The complete cessation and banning of nuclear weapons tests—that legacy of the “cold war”—is one of our policy's priorities.

I consider it specially important to note the activity in connection with the treaty of the IAEA [International Atomic Energy Agency], which verifies the states' fulfillment of their commitments regarding the nonproliferation of nuclear weapons and organizes international collaboration in the field of peaceful atomic energy and safe conditions for its use.

I wish the conference success in its crucial work.

[Signed] M. Gorbachev

CANADA

**Ontario Hydro Fined for Radiation Exposure**  
*90WP0156A Toronto THE TORONTO STAR  
in English 3 Aug 90 p A2*

[Article by Daniel Girard]

[Text] Ontario Hydro has been fined \$18,000 after admitting responsibility for the worst radiation exposure accident in a Canadian nuclear plant.

The utility pleaded guilty to four charges in Oshawa Provincial Court yesterday in connection with the accident at Pickering on August 9, 1989.

A fifth charge was dropped.

Judge James Crawford noted the convictions were Hydro's first in 20 years of operating the plant.

Both crown and defence lawyers recommended a \$4,500 fine on each conviction. The maximum fine is \$5,000.

Hydro pleaded guilty to three counts of allowing overexposure to radiation—one for each of the three affected workers—and one count of failing to take all reasonable safety precautions.

An official with the Atomic Energy Control Board, which laid the charges, said the fines, while not large in terms of Hydro's budget, will send a message.

"In terms of principle, we've done our job and pointed out that all was not right," board spokesperson Hugh Spence said from Ottawa. "Ontario Hydro has had to make changes to ensure something like this does not happen again."

But the dropping of a charge of failing to get prior approval for the work angered Sid Ryan, divisional chairman for Local 1000 of the Canadian Union of Public Employees. He said it was "the most important" charge and might have resulted in the revocation of Pickering's operating licence.

The accident occurred when a connector the workers were instructed to use while removing radioactive rods failed to shield them. It was later discovered the connector was supposed to be used for nonnuclear work in the plant's training facility.

One worker absorbed 12.7 rem, the highest radiation level ever recorded in a Canadian nuclear plant. Another worker received the second highest dose ever, 9.2 rem. The third worker absorbed 2.2 rem.

A rem is the unit for measuring harm caused by radiation on human tissue.

FEDERAL REPUBLIC OF GERMANY

**GDR-FRG Statement on Non-Proliferation Treaty**  
*LD2208110390 East Berlin ADN International Service  
in German 1027 GMT 22 Aug 90*

[Text] Geneva (ADN)—The text of the joint statement by the governments of the FRG and GDR at the fourth verification conference on the Nuclear Nonproliferation Treaty is as follows: "The governments of the Federal Republic of Germany and the German Democratic Republic affirm their contractually and unilaterally accepted renunciation of the production and ownership of and power to dispose of nuclear, biological, and chemical weapons. They declare that the united Germany, too, will adhere to these obligations.

"The rights and duties resulting from the Treaty on the Non-Proliferation of Nuclear Weapons of 1 July 1968 will continue to be valid for the united Germany. The united Germany will work to ensure that the Non-Proliferation Treaty will be valid beyond the year 1995 and calls for the strengthening of nonproliferation measures. At the Geneva disarmament conference the united Germany will work for a comprehensive, worldwide, and verifiable ban on chemical weapons at the earliest possible time, and intends to be among the first signatories to such a convention."

**Genscher Addresses NPT Conference**

*LD2208122790 Hamburg DPA in German 1022 GMT  
22 Aug 90*

[Excerpts] Geneva, (DPA)—Federal Foreign Minister Hans-Dietrich Genscher today affirmed that a united Germany will renounce nuclear, biological, and chemical weapons. In a speech to the fourth verification conference for the treaty on the nonproliferation of nuclear weapons, which is attended by delegations from over 100 countries, he said in Geneva that disarmament and arms control policy would be a "central element" of the united Germany's peace policy. [passage omitted]

Genscher further announced that in the course of a tightening of the German foreign trade law "new and important commitments on exports of nuclear materials" to states not in the nonproliferation treaty, which will "as a matter of principle" be permitted only if those states put "all raw materials, particularly fissionable material," under the control of the comprehensive safeguards of the International Atomic Energy Agency in Vienna.

Genscher pointed out that the Treaty on the Nonproliferation of Nuclear Weapons, which came into force in 1970, has proven to be an "important cornerstone of international security." Therefore the Federal Republic advocates a long-term extension of the agreement beyond the year 1995.

The minister called for a worldwide ban of chemical weapons, as the events of the last few weeks have shown

clearly that such a ban is "today more urgent than ever." The Federal Republic would be among the first states to sign a chemical weapon convention.

### Illegal Nuclear Exports Trial Begins

*LD0509092590 Hamburg DPA in German 0732 GMT 5 Sep 90*

[Excerpts] Hanau (DPA)—The trial concerning illegal nuclear exports from Hesse to Pakistan opened before the Hanau Regional Court this morning. Accused are the former manager of Neue Technologien GmbH (NTG) in Gelnhausen, Rudolf Maximilian Ortmayer, and two former business partners, who are accused by the State Prosecutor's Office of violating the foreign trade law and law on the control of weapons of war. [passage omitted]

Together with physicist Peter Finke and chemist Heinrich Weichselgärtner, a former member of staff at the Max Planck Institute, Ortmayer is alleged to have for years exported nuclear technology and tritium gas to Pakistan without the necessary authorization. Tritium gas is needed for the construction of nuclear bombs. [passage omitted]

### Nuclear Export Permit Rules To Be Tightened

*AU2808184990 Duesseldorf HANDELSBLATT in German 27 Aug 90 p 1*

[“sm” report: “Bonn Tightens Rules for Nuclear Exports”]

[Text] Bonn, 25-26 August—The regulations on permits for nuclear exports to nonnuclear states which have not signed the nonproliferation treaty will be drastically tightened. This was decided by the FRG Government in a resolution of 9 August, which has not been published so far.

The resolution says that, in line with the foreign trade law, the FRG Government will permit new and sizable exports of nuclear technologies to recipients in nonnuclear states that have not signed the nonproliferation treaty of the Treaty of Tlatelolco only if these states have made all basic material and, in particular, all fissionable material subject to the safety measures of the International Atomic Energy Agency (IAEA).

The recipient countries thus have to generally subject all their nuclear facilities to IAEA control before the export of nuclear facilities, nuclear components, nuclear materials, and nuclear technologies from the FRG can be permitted. To receive an export permit in the past, it was sufficient for the German nuclear exports only to be subject to IAEA control. However, there have been repeated rumors that in some recipient countries, there has been an exchange between the civilian use of nuclear energy that is supervised by the IAEA and the nonsupervised military use.

For the time being, the Cabinet decision does not apply to existing obligations and permits. However, the FRG Government will adapt these obligations in negotiations

with the partners to the contracts—mainly affected are Brazil and Argentina—within five years to suit the requirements of strengthening the nonproliferation regimen, the resolution says. In addition, individual permits are to be limited to two years in all cases.

An exception from the principle of granting export permits only if comprehensive safety measures are guaranteed is envisaged for those cases in which the exports in question improve nuclear safety in the recipient country. However, the FRG Government stresses that the demand for comprehensive controls must not be undermined again by interpreting the issue of relevance to safety in too broad a way.

### Proposal To Monitor Illegal Technology Transfers

*AU2708143290 Hamburg WELT AM SONNTAG in German 26 Aug 90 p 6*

[Heinz Vielain report: “Office for the Protection of the Constitution To Monitor Certain Firms”]

[Excerpt] Bonn—Minister of State Lutz Stavenhagen (Christian Democratic Union) has proposed that the Office for the Protection of the Constitution [BfV] help prevent illegal technology transfers.

In a *WELT AM SONNTAG* interview, he said: “German exports of the type that have now become known following Iraq's poison gas threats must in the future be prevented on the basis of intelligence information.”

Stavenhagen is responsible in the Federal Chancellor's Office for the three secret services, the BfV, the Federal Intelligence Service (BND), and Military Counterintelligence (MAD).

According to Stavenhagen, the three types of higher punishments planned for perpetrators are not sufficient. He said that the public prosecutors must be allowed to intervene before export deals for the construction of secret poison gas plants or nuclear weapons are settled. “To that end, they need to have timely information of the type that an intelligence service can supply.”

Asked whether companies will therefore in the future be monitored by the BfV, the minister says that the point here is monitoring “the black sheep that regrettably exist, and by no means the whole range of companies.” Stavenhagen is convinced that business and industry also have an interest in “stopping such black sheep.” He said: “This extremely small minority of entrepreneurs not only considerably harms the Federal Republic's reputation; it also harms German industry's reputation as a whole.” Stavenhagen added: “The black sheep should be combated like terrorists, by intelligence service means.” [passage omitted]

### Authorization Needed for Foreign Missile Projects

#### Government Decree

LD2708090290 Hamburg DPA in German 0810 GMT  
27 Aug 90

[Text] Bonn (DPA)—The Federal Government has made the involvement of Germans in foreign projects concerned with missile technology subject to authorization. A relevant decree on the foreign trade law was presented in the Bundestag today. The obligation to obtain authorization holds for the development, manufacture, or testing of missiles as well as the components that are specially constructed for them and the computer programs that have been developed.

The Federal Government justified the decree as a consequence of the involvement of German engineers in missile projects in Iraq as well as in Egypt and Argentina. This had led to a "considerable disruption in the foreign relations" of the Federal Republic.

#### Exemptions to Decree

LD2708132490 Hamburg DPA in German 1203 GMT  
27 Aug 90

[Excerpt] Bonn (DPA)—Cooperation by Germans in the development and construction of missiles abroad is to be generally subject to authorization. The EC states as well as the United States, Japan, Canada, Norway, and Turkey, as well as the European Space Association (ESA) projects are excepted, it emerges from a further decree to tighten up the foreign trade stipulations that were published today in the Bundestag. The Federal Office for the Economy in Eschborn is responsible. [passage omitted]

### Genscher Urges Measures Against Weapons Exports

LD2708113990 Hamburg DPA in German 1045 GMT  
27 Aug 90

[Text] Bonn (DPA)—Federal Foreign Minister Hans-Dietrich Genscher (Free Democratic Party) has urged his party colleague Federal Minister of Labor Helmut Haussmann to take further measures against illegal weapons exports. The latest cases in Iraq show how dangerous efforts at procurement from the Third World can be, Genscher stated in a letter to the minister of the economy, it was learned in Bonn today.

Recently, reports that German enterprises are effecting illegal exports in "sensitive regions" have increased in an "alarming way". The good reputation of the German economic sector is becoming increasingly damaged. Genscher regrets the fact that the proceedings carried out against individual enterprises had often not had the required effect, in which connection he referred to a "serious loophole" in the law on the control of weapons of war.

In the check for reliability, which has to be carried out in accordance with the law, only the reliability of individuals is examined—the management or the executive of large enterprises are ignored. It usually suffices simply to transfer one employee within a firm in order to allow the reliability process to peter out. Thus the effect falls by the wayside.

Genscher implores Haussmann to make the instrument of the reliability check a stronger weapon in the fight against illegal exports. The process of checking should not only be aimed at individual employees, but also at enterprises as such, as well as their executives and managements. In addition, examination should also be provided for in the sphere of the Foreign Trade Law. Genscher wrote that he would be grateful if ideas were developed about that "as soon as possible."

### FINLAND

#### Power Agency: Waste Agreement With USSR Still Holds

90WP0118A Helsinki HELSINGIN SANOMAT  
in Finnish 30 Jun 90 p 3

[Article: "IVO Sticks to Agreement To Export Nuclear Waste to USSR"]

[Text] Loviisa (HS)—The Imatra Power Company (IVO) plans to continue to export spent fuel from nuclear power plants to the USSR. Last week the Congress of Russian People's Representatives gave the Russian Council of Ministers the job of drafting proposals the object of which is to prohibit waste produced by nuclear power plants in the other Soviet republics and foreign countries from being permanently buried on Russian territory.

IVO informed us that the company is still relying on agreements entered into with the Soviets to return [spent] nuclear fuel to them. According to these agreements, the Soviet Techsnabexport accepts all spent fuel produced at the Loviisa nuclear power plants.

Nuclear fuel is stored at the Loviisa nuclear plants for five years after being removed from the reactors. After that, in accordance with the agreements, it is returned by rail to Tchelyabinsk in the Southern Urals.

The year before last, 56 tons of spent fuel in two shipments were returned. The next agreed-on time for fuel to be returned is at the end of this year.

If, however, the exporting of nuclear waste to the Soviet Union should be terminated, IVO's own storage facilities will suffice for temporary storage until the second half of the decade.

Nuclear waste produced by the Industrial Power Company (TVO) operating in Eurajoki will end up in repositories to be excavated in Finland. The company has made studies of various repository sites over the past few years.

## FRANCE

### Plutonium Recycling Plant Project Approved

#### Creation Announced

90WP0092A Paris *LIBERATION* in French 23 May 90  
p 10

[Article: "Recycling Plant and Tripling of Profit for COGEMA"]

[Text] The General Nuclear Materials Company [COGEMA] yesterday got a green light from the government to build France's first plutonium nuclear fuel plant. The plant, to be located at Marcoule (in Gard), will fabricate "MOX," a mixture of oxides of plutonium and uranium. The great advantage of MOX is that it permits the recycling of plutonium taken from reprocessed uranium. COGEMA expects MOX to contribute to "reducing the quantity of [nuclear] waste requiring long-term storage." COGEMA's chief executive officer, Jean Syrota, told the press yesterday the company will invest more than Fr1.5 billion in the plant, which will fabricate 120 tons of heavy metal per year.

Although the construction permit was granted in February 1989, COGEMA had to hold off until yesterday, when the order was signed by the prime minister, the minister of industry and the secretary of state for environmental affairs. The project has thus been somewhat delayed, according to Mr. Syrota. Construction will take four years to complete. Supervised by COGEMA, it will eventually be run by the Melox Company. COGEMA and Framatome [Franco-American Nuclear Construction Company] are each to own a 45 percent interest in Melox, and Pechiney has an option for the remaining 10 percent. "Other international participants may be added later," Syrota said.

COGEMA's chief executive, who came to his present position in late 1988, also announced record profits for 1989. Consolidated net profits tripled in comparison to 1988, reaching Fr1.5 billion with a turnover of Fr23.6 billion. But Syrota was careful not to exaggerate his triumph, noting that in 1988 the company had to "sustain exceptional costs," whereas in 1989 it had benefited from such positive factors as "the billings for the Superphoenix [reactor] core and its first refueling." For 1990 he will be satisfied if profits top Fr1 billion.

#### Anger Expressed

90WP0092B Paris *LE NOUVEL OBSERVATEUR*  
in French 24-30 May 90 pp 46-47—FOR OFFICIAL  
USE ONLY

[Commentary by Fabien Gruhier: "Our Very Expensive Nuclear Venture"]

[Text] Our "free" plutonium has already cost France several billion francs. It will ultimately cost a great deal more to get rid of it...

It was a fairy tale that started long ago in the Giscard years: You take the spent fuel from ordinary nuclear power plants. You reprocess it at Hague, at the celebrated Cotentin plant, unique in the world. And miracle to behold! out comes plutonium. Which in turn would serve as fuel for the dozens of Superphoenix-type power plants that would undoubtedly spread all over free Europe in the years to come. What one needed to start up the cycle was an enormous supply of plutonium. A by-product of nuclear fission, it had to be recovered from the "ashes" of ordinary nuclear fuel. Until the day should come when large numbers of breeder reactors would provide it in almost limitless quantities.

Alas! Giscard's technocratic miracle has not occurred. True, the atomic equations do work the way our dear engineers predicted. But Superphoenix is not a success. The history of that aging reactor, put in service after five years of delay, is a chronicle of disastrous breakdowns and disturbing accidents. Moreover, the economic environment has changed: There is so much cheap uranium on the world market that no one knows what to do with this disastrous "free" plutonium. As a consequence, no more Superphoenix-type reactors have been started. The Creys-Malville reactor facility thus seems a technological dinosaur, even if, in a typically French demonstration of therapeutic obstinacy, we keep it operating between breakdowns, cost what it may.

But here is the definitive proof of its failure: The fuel used by the Superphoenix has been changed, without fanfare, so that even during those rare weeks when that antiquity feels like running, it is not producing any plutonium. It has thus been deprived of the purpose for which it was conceived and on which its international reputation was built. Stop Superphoenix from producing plutonium? That is like banning Cousteau from diving, Joan of Arc from supporting Le Pen, Noah from losing games. No matter: Everything else has been put in place in accordance with the initial plan. Several dozen EDF [French Electricity Company] nuclear power plants are in operation in France. We have set a world record: 80 percent of the electricity we consume comes from atomic energy. We have more than enough. We even sell it to those timorous countries that rejected nuclear power and are quite happy today just to be connected to our high-tension power lines. But what to do about the plutonium?

We are sinking under the weight of plutonium, that relatively rare radioactive element which does not exist in nature and which spontaneously decays (by disintegration) into americium or neptunium. The plutonium becomes unusable after several months of storage. And it is not merely radioactive: It is a terrifying poison, one which can kill a person in doses as small as one-thousandth of a milligram. A quantity of plutonium the size of a grapefruit could kill all mankind. If one plans to use it, one must do so quickly, and very carefully. It must be extracted, concentrated, purified under close supervision. Infinite precautions must be taken when transporting it to nuclear fuel facilities. Jean-Jacques Mira of EDF's fuel division acknowledges the difficulty. But not the danger: "If certain precautions are taken, as we do, there is no particular danger." Well, that's a relief! But the question remains: Why the devil does EDF have anything to do with this horrible plutonium, when the economic situation has made the idea of Superphoenix breeder reactors obsolete? The answer: When billions of francs have been thrown into a stupid venture, best make it look like something useful has been gained, or the taxpayers will be unhappy. Even worse: Our engineers would look like fools.

It was the taxpayers, not engineers, who paid billions of francs to build the plant operated by COGEMA (a subsidiary of AEC [Atomic Energy Commission]) at Hague, near Cherbourg. An industrial facility unique in the world, built especially to extract plutonium from nuclear fuels, it was for quite some time the biggest construction project in Europe, until work began on the tunnel under the English Channel.

The biggest construction project in Europe? God knows how many billions of francs have been spent to scrub clean those dirty atoms. All for the sake of extracting some plutonium that is now... useless? It was thus a fairly urgent matter to find a use for that plutonium. No one will be surprised to learn that our dear French engineers at EDF and COGEMA and our great engineering colleges (unique in the world) have found the solution: They are going to try to burn the plutonium up little by little. They will slip small quantities of it incognito into future fuels that supply our reactors designed to burn uranium. This is the MOX program—meaning "mixed oxide fuel"—which is based on putting a tiny dab of plutonium in with the uranium for the nuclear reactor fuels. In this way, it is claimed, a very small percentage of uranium will be "saved." But no one dares claim this is of any economic value.

On the one hand, you have the enormous reprocessing plant at Hague—and somehow it must be made to serve a purpose. On the other, you have this string of nuclear plants which burdens us with spent fuel. Between the two, you have the possibility of recovering, albeit at great cost, an ultradangerous plutonium for which no one has any use, since the Superphoenix reactors which were supposed to absorb it have been abandoned. So far the MOX program that is supposed to dispose of this undesirable plutonium involves only 16 EDF plants. On the basis of the official

figures published, simple arithmetic shows the program cannot possibly absorb all the plutonium produced. At best it can absorb one-fourth of what is produced between now and the year 2000. The rest will continue to accumulate at Hague, Marcoule, or elsewhere. In the form of ingots of accursed metal. Or more likely in fuel cylinders at the bottom of pools in the reactor facilities, waiting—probably in vain—for reprocessing.

Jean Syrota, the chief executive officer of COGEMA (a subsidiary of AEC, which owns the enormous Hague facility), a man who concerns himself with the nuclear fuel cycle in its entirety, is still sure of himself and his fine technology. With complete conviction he recites his scientific breviary: Yes, all the fuel produced by EDF plants will be reprocessed. Yes, all the plutonium extracted will be consumed via the MOX program. Yes, reprocessing is the only way to isolate the frightful residues of nuclear fission, concentrate them, and vitrify them once and for all. All the same: France does not know what to do with its plutonium. Even at EDF, which in spite of everything is still a commercial enterprise, people are beginning to distance themselves from this lunatic reprocessing venture conceived in an era when it was thought plutonium might be good for something. Thus Jean Beaufrere in the fuels division merely says "the reprocessing option should be kept open, at least initially, considering the commitments already made." Which is as good as admitting that commercial considerations will eventually get the better of this grandiose reprocessing technology, and the huge plant at Hague will someday be a historic monument.

One thing is already clear: Quite apart from all the uncertainties that plutonium adds to the nuclear safety equation, recycled plutonium will cost EDF more than new uranium-based fuel. Would you clean and iron your shirts, if it cost more than throwing them away and putting on a new one each morning? In short, we have on our hands a superb nuclear fuel reprocessing facility, unique in the world... which serves no purpose. We have paid a high price for it; it was what Giscard the technocrat wanted. You remember him? The one who promoted "sniffing" airplanes, God's gift to science, the renowned liberal who stuck his presidential nose into the research divisions of private corporations?

Anyone can make a mistake. Commenting on the power company's projections on energy consumption, EDF's Jean-Jacques Mira says: "At EDF, we know very well how much faith to put in long-term projections."

**Tests Conducted on Nuclear Plant Safety**  
*90WP0145A Paris REVUE GENERALE NUCLEAIRE*  
*in French May-Jun 90 pp 241-242*

[Article: "Nuclear Power Plants; False Terrorists, Real Security Test"]

[Text] In one of its April issues, LE CANARD ENCHAINE wrote that in 1987 DGSE [General Directorate for External Security] commando teams tested the

effectiveness of the security measures installed at French nuclear power plants. The result: One of the commandos allegedly succeeded in reaching the main control room of the Nogent-sur-Seine generating station, while at Bugey another team managed to plant two "bombs" at the base of a cooling tower.

EDF [Electric Company of France] denied the first claim: It said secret agents had never broken into the Nogent control room. "These were tests carried out by EDF personnel as part of routine security procedures before the power plant went into operation," said Jean-Francois Bernard, who supervised construction of the Nogent facility. "As in any surprise inspection, neither the personnel nor the management at the plant were given advance warning of the actions to be carried out at the behest of the ministries," he said.

As for the "saboteurs," they did succeed in penetrating the external security perimeter at the Bugey site, but not much further. At worst, according to EDF, "explosion of the bombs would have shut down power production at the plant, but would not have created a nuclear hazard."

These secret tests of the EDF security system were confirmed by Robert Pandraud, who was the minister responsible for security: "It is true that along with my colleague Alain Madelin (minister for industry) I was very concerned with security and safety issues at the nuclear power plants," he said, following LE CANARD ENCHAINE's "revelations."

At the press conference held in late April in the wake of those news stories, Pierre Carlier, EDF's chief of thermal production, disclosed that in all French nuclear power plants "there is a second control room, carefully hidden, from which one can shut off and cool down the reactor, and thus protect the safety of the installation in case of a fire—whether accidental or started by terrorists—or a hostage situation."

Also, the main control room is automatically sealed off, so a commando that succeeded in penetrating it would be unable to get out..." No one has ever succeeded in penetrating the reactor building or a control room once the facility went into operation," he asserted.

"Various exercises, initiated by EDF or the ministries concerned, are carried out several times a year on each site. The 'penetrations' disclosed by LE CANARD ENCHAINE were carried out as part of a routine testing program," Mr. Carlier added.

As for the reactor building, "it is absolutely inaccessible," he maintained. Moreover, the reactor vessel is protected by steel armor designed to withstand extremely powerful explosives.

"It is true that the steam vents are a sensitive point, but we take their vulnerability into account. We work under the auspices of the defense ministry. Here at EDF we are not experts in assessing the threat posed by terrorists or criminal gangs," added Mr. Lucien Bertron, EDF's deputy director for power generation and transmission.

"Other people in government specialize in these areas. We work with them in designing the specific features of the security systems. Our role is to verify that our installations are in fact safe."

People are the "weak link" in the security system. Some 300,000 people visit the plants each year—naturally they are checked out beforehand and accompanied when they tour the premises—but more importantly, thousands of people employed by EDF as well as outside companies work there. Their background and character are checked, "but there is no way to be fully protected against people who are determined to cause damage," Mr. Bertron admitted.

There are 80 security personnel, half of them EDF employees, at every site. "The others are security service employees who have been checked out by governmental agencies," said Mr. Bertron. "Our guards are not armed, but two constables are always patrolling each power plant, and they are in constant radio contact. If an intrusion is detected, they are alerted immediately, and reinforcements are sent to the scene."

Also, no unauthorized vehicle has penetrated any of the sites since 1987. EDF and delivery vehicles are systematically searched.

## IRELAND

### 20-Fold Drop in Irish Sea Radiation Reported

90WP0123A Dublin *IRISH INDEPENDENT* in English  
12 May 90 p 2

[Article by Stephen McGrath]

[Text] Radiation levels in sections of the Irish Sea have fallen 20-fold since 1976, research by the Nuclear Energy Board has revealed.

The dramatic drop is attributed to better waste management at the Sellafield nuclear reprocessing plant on the Cumbrian coast in England.

The nuclear board's senior scientific officer, John O'Grady, said there had been a huge decrease in the amount of low-level liquid radioactive waste in sea water along the east coast of Ireland since the mid-1970's.

Research now showed there is no danger to the Irish public from fish caught in the west Irish Sea, he explained. And it is not correct to label the east coast of the Irish Sea as the most artificially radioactive in the world, he said.

Survey results by the Nuclear Energy Board, published in Technology Ireland, reveal that Caesium 137—the most widespread form of artificial radiation in the west Irish Sea—is now five per cent of this 1976 level.

Mr. O'Grady said the huge improvement in the situation with regard to artificial sources of radiation could be put down to better waste management by British Nuclear Fuels Limited at Sellafield.

Levels of Caesium 137 in sea water had declined from two becquerels per litre to 0.1 becquerels per litre off north Co. Dublin and Co. Louth. The hazards posed by artificial sources of radiation are now low compared to those occurring naturally.

"There is no need to worry about artificial radiation in sea water off the Irish coast. Even at their highest, levels were way below natural levels of radiation. Even at peak level there was no hazard," Mr. O'Grady added.

### Officials Protest Operation of Sellafield Plant

#### Energy Secretary

90WP0122A Dublin *IRISH INDEPENDENT* in English  
22 May 90 p 9

[Article by John Downing, Tony O'Brien]

[Text] Ireland last night launched a new attack on Sellafield and Britain's other aging nuclear plants.

Their lives were being extended for mainly economic reasons and with no public certainty that they meet current safety standards, claimed John Loughrey, secretary of the Department of Energy.

He outlined Ireland's concerns at talks between EC energy ministers in Brussels, singling out Sellafield particularly as long overdue for closure.

His attack came as British Ambassador Sir Nicholas Fenn expressed his personal sadness at Dublin Corporation protests over the 220 million [currency not specified] deal to reprocess German nuclear waste at Sellafield.

In a letter to the corporation's environmental committee, he said: "In the context of our partnership in the European Community I find it sad that the committee should feel it appropriate to condemn co-operation of this kind between two member states."

Public opinion in Britain was "firmly in favor of retaining a nuclear component in our power generation since it is the least harmful baseload fuel and does not contribute to acid rain or the Greenhouse effect," he said.

cessing spent fuel, in which Sellafield plays a key role, is an important part of the nuclear industry, and is the only proven and dependable way of managing irradiated fuel elements once removed from the reactor."

However, Mr. Loughrey insisted at the Brussels meeting that Sellafield had become a world center for reprocessing nuclear waste, not just from the UK, but for other countries which would not tolerate reprocessing on their own territory.

The system was no longer justified, he claimed: "It is now an ad hoc solution to the political and technical difficulties of solving long-term waste storage problems and is leading to the accumulation of vast quantities of dangerous waste in a few locations."

Mr. Loughrey also said that discharges into the Irish Sea from the Sellafield nuclear reprocessing plant were continuing and could increase in the future, as new plant was brought into operation. "We are adamantly opposed to continuing discharges and we consider the plant should be closed as a means of terminating them," he added.

The ambassador's letter was read last night to a meeting of Dublin City Council called to discuss the latest Sellafield controversy. It voted unanimously to condemn the "callous and thoughtless" reprocessing deal between West Germany and the UK, and called on the government to raise the Sellafield issue at forthcoming environment and heads of state meetings in Dublin.

#### Energy Minister

90WP0122B Dublin *IRISH INDEPENDENT* in English  
19 May 90 p 7

[Article by Bernard Purcell]

[Text] A claim that Energy Minister Bobby Molloy backed down from his demand for the closure of Sellafield at a meeting yesterday with the British energy secretary, was denied as "absolutely untrue" by a government spokesman last night.

The British Department of Energy had suggested that Mr. Molloy hadn't even raised the issue of closing the Sellafield nuclear power station at the lunch meeting in London, but a spokeswoman for Mr. Molloy said he had brought it up on three occasions.

He had raised it with the British minister in the presence of the Irish Energy Department secretary and the Irish ambassador.

"He also asked that emissions into the Irish Sea be reduced to zero and that an EC nuclear safety inspectorate be established," she said.

Asked what the reaction of British Energy Secretary John Wakeham had been, she said: "He listened to him."

According to the departmental source in London, Mr. Molloy had said there was great concern about Sellafield in Ireland and it would be allayed by the establishment of a nuclear safety inspectorate. This was emphatically turned down by the British minister, the London source said.

The two men are meeting in advance of Monday's gathering of EC energy ministers in Brussels. Over the lunch, described as "extremely fruitful and friendly" at Lancaster House, they discussed Monday's agenda.

## NORWAY

**Safety Readiness Judged Poor After Kola Incident**

90WP0128A Oslo *AFTENPOSTEN* in Norwegian  
23 Jul 90 p 28

[Article by Harald Brynildsen: "Mysterious Cloud Followed by Flurry of Letters"—first paragraph is *AFTENPOSTEN* introduction]

[Text] The "mysterious cloud" over the Kola peninsula in early June seems no less mysterious today. No Norwegian authority is able to confirm that there really was a special cloud over the area. And the Russians have clearly stated that no one there observed anything abnormal over the ocean or the land at the relevant time.

"Our Russian colleagues insist that there was no special cloud over Kola during the period in question," Leif Otto Hagen of the Norwegian Institute of Atmospheric Research [NILU] told *AFTENPOSTEN*.

Nor has Erik Anders Westerlund, acting director of the State Institute of Radiation Hygiene, heard any more about the alleged cloud formation—whatever it might have been.

"The important thing for us is the information that no abnormal radioactivity was measured in the atmosphere," said Westerlund.

**Lively Correspondence**

But the "mysterious cloud" is still with us in the form of a lively correspondence between government offices in southern and northern Norway.

The Directorate for Civil Defense and Emergency Training wrote to the county commissioner of Finnmark on 11 July that nuclear preparedness will be discussed by a new committee appointed by the government. The letter is a reply to a letter from Acting County Commissioner Ingrid Rostad who called for better notification procedures for nuclear accidents in peacetime. She requested "a warning system that monitors the air in our region on a continuing basis and issues a warning if increased radioactivity is recorded."

**Notification Too Slow**

During and just after the "cloud incident" Acting County Commissioner Rostad strongly complained in the media that the county commissioner was not notified as quickly as one might reasonably expect, a complaint that was also expressed in a letter from Storting representative Reidar Johansen to the Action Committee for Nuclear Accidents (AVA). This criticism was immediately repudiated by AVA which claimed that local state authorities in Finnmark were notified as soon as practically possible. AVA became aware of the matter at 1440 hours on 6 June. After notifying the other committee members—and making some quite necessary inquiries

among Finnish experts and others—the county physician for Finnmark was notified at 1515 hours.

From the very first AVA had learned that there was very little indication of any radioactive pollution and that the "cloud" was moving to the south and away from Finnmark.

**Could Have Been Told Sooner**

"If the situation had indicated any actual and/or immediate danger to the population in Finnmark, we could have warned the local authorities in Finnmark around 20 minutes earlier if necessary and issued similar warnings to the Foreign Ministry, our information director, AVA's other members, etc.," the committee's deputy assistant health director, Anne Alvik, wrote in her letter to the Storting representative.

**Must Follow Plan**

After this exchange, Acting County Commissioner Rostad wrote to AVA on 7 July and pointed out that the county commissioner was not notified before 1615 hours while the county physician was informed an hour earlier. "If AVA finds it expedient to notify the county physician directly, it does not excuse AVA from following the notification plan that has been established," Rostad wrote.

**Responsibility Unclear**

The file on the suspicious cloud also includes a letter from Acting County Physician Siri Fosse who "had been considering our readiness for possible environmental catastrophes in Finnmark." Among other things the county physician mentions that the acting county commissioner was in the county on 6 June. "However she went to Oslo on the morning of 7 June and it is unclear to me and (civil defense leader Per Einar) Fiskebeck of the environmental protection division who in Finnmark then became responsible for providing the public with further information.

## SWEDEN

**Ringhals 2 Unit Approved for Restarting**

90WP0133A Stockholm *DAGENS NYHETER*  
in Swedish 24 Jul 90 p 7

[Article by Karin Bojs: "Ringhals 2 Ready To Be Restarted"—first paragraph is *DAGENS NYHETER* introduction]

[Text] On Monday afternoon the National Nuclear Power Inspection Board decided that Ringhals 2 will be permitted to restart.

During a routine inspection in May, inspectors discovered that for some unknown reason some of the Ringhals 2's tubing had been bent. This was viewed as very

serious, since some of the tubing contains the control rods with which the radioactive process can be controlled and halted.

Therefore the National Nuclear Power Inspection Board decided that Ringhals would not be allowed to restart until management could prevent the tubing from being damaged.

The tubing is manufactured by the German firm of Siemens and is made of a metal alloy containing primarily the element zirconium.

Technicians gradually concluded that the tubing had bent because the material had been affected by moisture and become more brittle—a so-called hydration had taken place. Until this incident, such damage was unknown within the nuclear power industry despite the fact that the entire Western world uses tubing of the same type. Technicians have still not discovered why the zirconium alloy was affected by moisture. Instead they have come up with a solution which the National Nuclear Power Inspection Board has now accepted.

"We have gone through and measured all the tubing. Only what is in good condition will be used for the control rods. For the other tubing we can only accept the tiniest discrepancies," said Lars Widen, the head of operations at Ringhals 2.

#### Closed Chapter

He repeated that the hydration of the tubing was a closed chapter for the current tubing. There is no danger that the zirconium will totally decompose, he stated.

"We're talking about a very rapid process which you can stop ever so slowly. And that has now happened."

Today, Tuesday, loading of Ringhals can begin after approval by the National Nuclear Power Inspection Board. This means it can go into operation beginning 7 August, two months later than planned.

The damaged tubing has meant that Ringhals 2's annual shutdown lasted three months instead of one. In economic terms this means a loss of approximately 10 million kronor.

"It's a fairly moderate loss, thanks to the fact that the shutdown occurred at an opportune time, in the middle of the summer," said chief of operations Lars Widen.

#### TURKEY

#### Minister to Argentina To Discuss Nuclear Power

TA3108152990 Ankara ANATOLIA in English  
1507 GMT 31 Aug 90

[Text] Ankara (A.A.)—Energy and Natural Resources Minister Fahrettin Kurt left for Buenos Aires on Thursday for an official visit to Argentina.

During his stay in Argentina Kurt will visit various nuclear power stations and inspect the latest Argentine nuclear technology.

He will return to Turkey on September 9.

#### UNITED KINGDOM

#### Methods of Assessing Nuclear Waste Dump Safety Scored

90WP0141A London THE DAILY TELEGRAPH  
in English 17 Jul 90 p 6

[Text] Resources for assessing the safety of sites planned for Britain's £1.6 billion national nuclear waste dump have been criticised as inadequate by Government advisers.

The independent Radioactive Waste Management Advisory Committee condemned the Environment Department's methods used to assess plans for burying low and intermediate level waste.

News of the overstretched resources will come as no surprise to the nuclear industry, which has had to wait around a year for planning applications to be granted.

It has also seen a muddled approach to nuclear waste disposal by successive Governments since the first expert panel on radioactive waste was set up in the mid-1950s.

The dump will be at either Dounreay in the Highlands or Sellafield, Cumbria.

"We are going to consider the report and respond accordingly," said a spokesman for the Environment Department, which is constantly updated on plans for the national repository by UK Nirex, the national nuclear waste agency.

#### Energy Officials Scored Over Nuclear Power Management

90WP0144A London THE DAILY TELEGRAPH  
in English 27 Jun 90 p 4

[Article by Roland Gribben, business editor]

[Text] The cost of building the Sizewell B nuclear power station in Suffolk has risen by only 8.5 per cent to just over £2 billion, Mr. John Wakeham, Energy Secretary, said yesterday as the row over the bill for the atomic plant reached a new pitch. The government had no intention of halting the construction of the plant.

Mr. Wakeham said that he was largely to blame for the increase in costs of the pressurised water reactor.

But Friends of the Earth, which published a leaked paper produced by Nuclear Electric at the weekend showing that the cost of Sizewell could be anywhere between £2.6

billion and £3.8 billion, accused Mr. Wakeham of carrying out a "desperate public relations exercise based on partial analysis."

The environmental group said that the £2.03 billion cost estimate did not include any allowance for inflation, £199 million written off by "more prudent accounting policies" and an estimated £900 million in interest payments.

The government and Nuclear Electric, the company set up to run the atomic stations in England and Wales, are braced for a further assault on nuclear power today with the publication of a highly critical report from the Commons Energy Committee.

The committee is scathing in its criticism of Mr. Parkinson, Transport Secretary and former energy secretary, over nuclear issues and the events which led Mr. Wakeham to exclude atomic power from electricity privatisation.

Mr. Wakeham is ready to stage a robust defence and is said to be prepared to make a "point by point" rebuttal of the committee's charges.

Mr. Wakeham said that his decision to halt further nuclear power construction had contributed to the £160 million increase in the construction cost of Sizewell. Extra costs were being incurred because construction companies could no longer spread charges over a family of pressurised water reactor stations.

"A large part of the increased cost is accounted for by the re-allocation to Sizewell B of in-house costs, which have already been committed but were to be shared with the later stations," he said.

Labour has estimated that cancelling Sizewell would save £2 billion but Mr. Wakeham put the figure at £990 million and said the cost of power from the atomic plant would be cheaper than from coal and comparable with the cost of electricity from a gas-fired plant.

But Nuclear Electric said that the generating cost could be up to 5.7p a unit, to meet the government's new target of an 8 per cent return on public sector investment, against 4.5p for coal.

Mr. John Collier, company chairman, said Sizewell would produce environmental benefits during its lifetime, saving 100 million tonnes of coal and almost 300 million tonnes of carbon dioxide. The plant would be operating in 1994.

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*10 Oct. 1990*